flying

SAFETY

APRIL 1987

SPECIAL ISSUE

Mishap Review and Forecast

THERE I WAS

"There I Was" incidents don't just happen to U.S. aircrews. They happen to crewmembers from every nation as shown by the following story sent to us from Australia.

■ Back in the sixties, Rick and I crewed a twin-jet, originally designed as a high-level bomber, but now pressed into service as a photo-recce ship. We were based in NATO, and every year there was a competition, target for target, country against country. Our flying was very low level, not very fast, but definitely all weather.

On the day, the usual mixture of targets was presented — dams, missile sites, bridges, platoons in hedges, that sort of thing. The opposition was flying F-84s — much nippier than us, so our answer was to organize our program into a series of "running changes."

That is, an aircraft would return from a mission and be parked, engines running, while the camera magazines were changed and the second crew, clutching maps and briefing sheets, clambered aboard — all in all about a three minute job. Then off, licketty-split, while the other side was still refueling.

Rick and I were senior crew, pretty good and, therefore, last to fly. We had four targets to pinpoint, and we managed to get the first three as if it was the real thing, sneaking up on them with the oblique camera whirring madly away.

The last target, though, was not so easy. The Army was well camouflaged in thick secondary scrub and had had the good sense to site themselves directly under a thunderstorm. Now, two passes were really the maximum operationally reasonable, but there was no way we were leaving without good pictures — our mission was decisive to the tournament.

So we hung around at 200 ft as the Cb slowly moved off the map-reference. Then we slipped in, and, sure enough, there they were, tucked away, but not hidden well enough for real experts.

Unfortunately, this last target was the farthest away from base. We got our first (of the two) fuel-warning lights about twenty minutes inbound. It was obvious the crew before us had had their problems, too, in getting all their photos.

No way, however, were we going to divert — you only won if you got the pictures back home, and anyway, everybody knew the lights were pretty pessimistic.

The weather was only 4-5/8 Cu-Cb, but yes, you've guessed it, there was a storm over the field, when we, flying *very* gently now, got within sight. We tried an approach, but it was no go — we went out in driving rain and severe turbulence on long finals.

So it was round again — and that's when the second light came on. As circuit height was a definite no-no for the Mk I bang-seat (and anyway, the engines were still going, weren't they?). Rick made as tight a circuit, in and out of rain, as I've ever experienced, and we splashed down any old how on a drenched runway. Windshear, luckily, had not yet been invented.

We taxied sedately to the lines and, trying not to think too hard, rushed to the caravan for debriefing with the photo-interpreters. We had the targets OK, and it wasn't until later that Chiefy (NCO i/c servicing) quietly told us that we had closed down with all tanks empty and a mere 250 lb (30 sec) in the collector-boxes.

Funny, it didn't seem such a big deal then — perhaps because we were so young. Now I get into a cold sweat just thinking about it.

On that day, I reckon, we used up someone else's luck as well as our own — so please, you guys out there, don't let it be yours! ■

UNITED STATES AIR FORCE

flying

SAFETY MAGAZINE

AIR FORCE RECURRING PUBLICATION 127-2 | APRIL 1987 | VOLUME 43, NUMBER 4

AFRP 127-2
Entered as a publication at the Second-Class rate (USPS No. 586-410) at San Bernardino Postal Service, 1331 South E Street, San Bernardino, CA 92403 and additional entries.

SPECIAL ISSUE

The USAF flight safety success story continued in 1986. Although we didn't beat 1985's record rate, there were a number of significant improvements in all areas of the mishap prevention program.

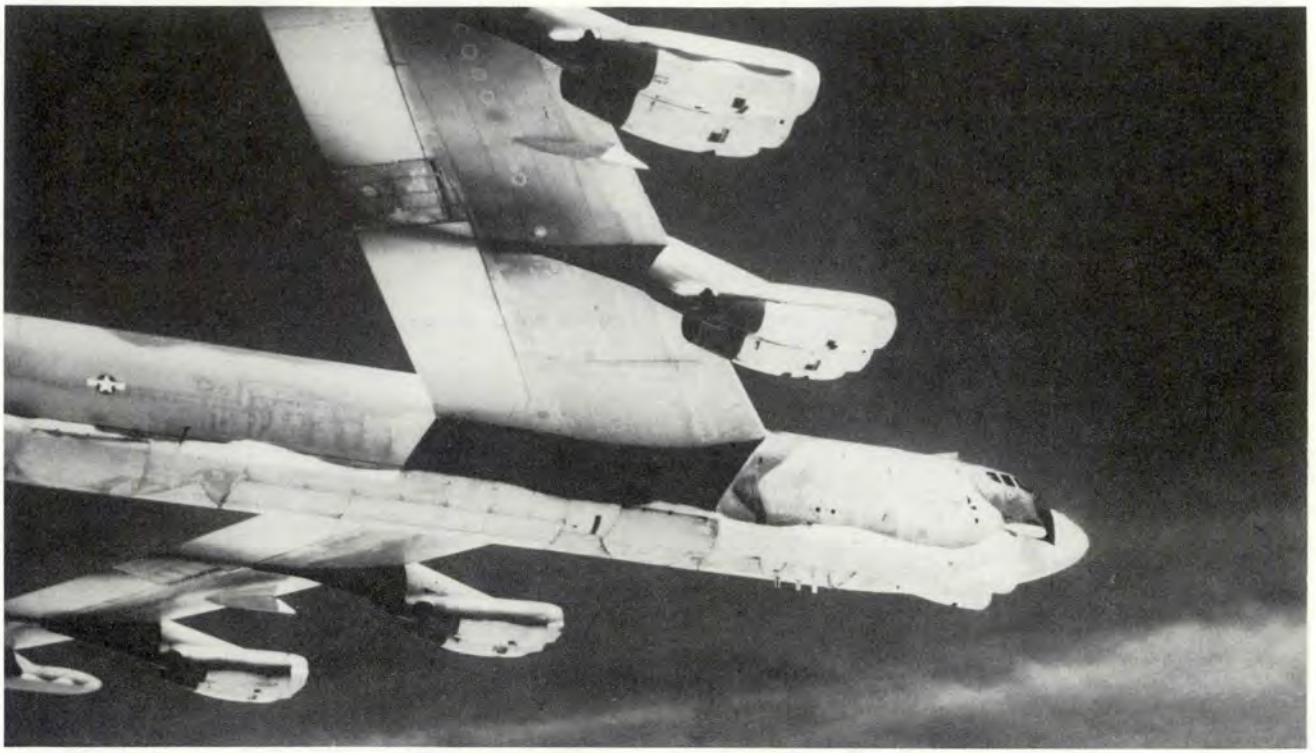
The bomber community had a 0 Class A rate, and the cargo community had a 0.42 Class A rate. The operations rate for cargo aircraft was 0.25.

In this issue, we take a close look at how we did in 1986 in our heavy aircraft. This issue also contains the 1986 USAF Ejection Summary.

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF



B-52

MAJOR MILTON H. WADDELL
Directorate of Aerospace Safety

■ Congratulations to all B-52 aircrews and the thousands of other people who worked countless hours to keep the aircraft flying. The B-52 has completed two consecutive years without a Class A or Class B mishap. Never before has this feat been accomplished.

The first B-52 became operational in 1955, and the last H model was delivered in 1962. A total of 742 models (A thru H) of this magnificent flying machine were built.

Today, SAC owns 263 (167 G and 96 H models). Five are in the test inventory, and the remaining 474 have either been scrapped, destroyed, or placed in extended storage over the years. The active B-52s are stationed at 14 bases across the CONUS and at one overseas base.

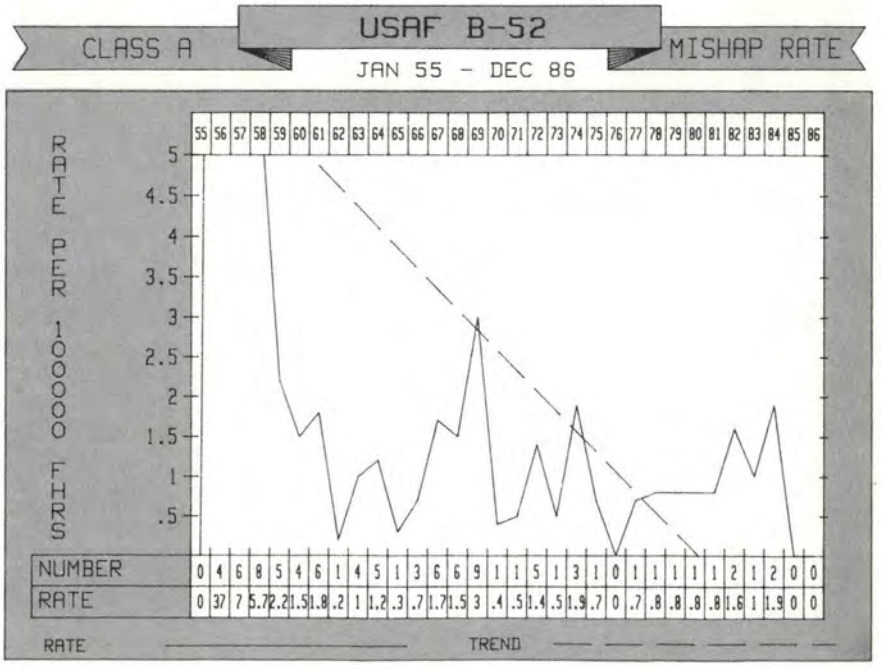
The "Buff" has amassed approximately 6,758,227 flying hours, with 102,411 of those hours being flown last year. Its overall mishap rate is 1.33 and, of course, 1986's rate was a big zero as compared to the Air Force's 1986 rate of 1.79.

Figure 1 shows which years the 90 Class A mishaps occurred. These mishaps resulted in the loss of 307 lives and 71 destroyed aircraft. This article will address the B-52's recent mishap experience, trends, current actions, and modifications, as well as the 1987 forecast.

Mishap History

I am happy to report the B-52 did not meet AFISC's prediction of one Class A and one Class B in 1986. The Class A predicted was a controlled flight into the ground, and the Class B was a pilot-induced landing mishap.

Figure 1



To make these predictions, one of the primary influences is the information found in the B-52 historical data. This data showed three phases of flight which continue to be concerns. These phases of flight are takeoff (27 mishaps); low level (13); and approach, landing, and go around (16). Since 1979, there have been four operations and four logistics-related Class A flight mishaps.

Figure 2 shows the phase of flight and whether it was an operations or maintenance-related mishap. The asterisked mishaps under the maintenance column indicate operations involvement (i.e., although the mishap was caused by maintenance or logistics factors, timely corrective action by the pilot(s) could have either prevented the mishap or mitigated the damage).

Figure 2
B-52 Class A Flight Mishaps (1979-1985)

PHASE OF FLIGHT	OPS	MAINT
Engine Start		1*
Takeoff	1	
Climb		
Cruise		1*
Low Level	3	
Landing		2

*Operational involvement

1986 Mishaps

For 1986, the B-52 fleet experienced 43 Class Cs and 34 HAPs (15 water-injection related). This was a significant decrease from the 1985 Class C total of 91. But remember, the Class C cost reporting criteria increased to $10,000. The number of HAPs reported in 1985 was 34 (20 water-injection related).

The Class Cs for 1985 and 1986 are compared in Figure 3. Three areas of concern — bird strikes, physiological/pressurization, and water-injection mishaps — will be discussed.

- In 1986, the majority of bird strikes we experienced occurred during low level. Remember to keep at least one visor down, and it may one day save your eyesight or even your life.

Also, during your mission planning, take an extra moment while studying the scheduled low-level route to check on the seasonal migratory routes for any potential hazards. Plan ahead!

Finally, the BASH community is working to improve the information available to aircrews on a daily basis. One day in the future, you will be at your weather briefing and receive information on the location of bird activity along your route.

Figure 3
B-52 Most Common Class Cs and HAPs

	1985	1986
Bird Strikes	42	11
Pressurization/ Physiological	12	11
Engine Failures/ Fires	7	9
Weather	6	5
Landing	5	3
Water	20	15

- The physiological/pressurization mishaps continue to be a genuine concern. SAC experienced 10 in the B-52. Five of the mishaps involved pressurization problems due to equipment failure. Smoke and fumes were the villains in 3, and 2 very unsuspecting crewmembers (in different aircraft) complete the 10.

Equipment malfunction procedures were performed according to the Dash 11. In the case of the crewmembers, one experienced the dreaded bends because of a previous shoulder injury, and the other one flew with a mild cold. How many of us have done that? Before

continued

I move to water injection, I will leave you with one flight level to think about — FL180 (clue: Atmospheric pressure).

■ Water injection is a near and dear topic of discussion among the G-model drivers. Three major TCTOs were accomplished. The first one incorporated an electrical diode to maintain electrical contact between the microswitches. The second one inspected and adjusted, where necessary, all engine fuel control power level angles. The final TCTO added a 200-millisecond relay to the existing inhibit relay.

These TCTOs did not quite solve the loss-of-water-injection problems. HQ SAC and Oklahoma City-ALC initiated a new modification consisting of an electrical tach-generated water initiation system. This design seems to be a winner. Testing began the second week in January at Castle AFB, California. I am anxiously, as I know you are, awaiting the results.

Modifications

This intercontinental, heavy bombardment aircraft is capable of many diverse missions including tactical environment area denial, penetration for hard target attack, stand off launch of ALCMs, antiship sea lane control, reconnaissance, and combat crew training.

For you to accomplish these tasks, the aircraft is continuously updated and improved. Major modifications in progress are:

■ The digital autopilot system (which will replace our present old vacuum-tube autopilot) will eliminate those untimely pitchups/downs during air refueling and low level. The completion date is FY 1989.

■ The offensive avionics system (OAS)/cruise missile integration modification is to modernize the bombing and navigation system on all G and H models and incorporate the cruise missile. The OAS portion of the modification is complete. The cruise missile integration provides external ALCM carriage on 99 G models and 96 H models. The G models are complete, and the H models will be finished in FY 1990.

■ The existing fuel quantity indicating system is being replaced with solid-state analog, pointer-type indicators, new all metal probes, new wiring harness and connectors, and associated hardware. The completion date is FY 1988.

■ PAVE MINT (ALQ-172(V)1) is affecting 129 G models. It includes an update of the ALQ-117 electronic countermeasure system and provides improved threat warning and jamming capability. The completion date is FY 1991.

■ ALQ-172(V)2 affects 96 H models. It is an updated ALQ-117 system using a new, phased array antenna system. It also provides an improved threat warning and jamming capability. The completion date is FY 1991.

■ The strategic radar is a reliable, maintainable, and supportable improvement to the present radar system. Fiscal Year 1991 is the scheduled completion date.

■ The environment control system replaces the existing air conditioning system pack with a more efficient unit that will provide better pressurization and cooling for new electronics. The completion date is FY 1989.

The Future

When I was on the other side of the desk and wearing a flight suit, I would get highly upset when I reached the end of these yearly review articles and read the predictions. I could not imagine some person telling me, "yours truly," or some other bomber guys were going to wreck an airplane or two. Well, now I am that person, so here it is.

One Class A and one Class B flight mishap are predicted for 1987. The Class A will be controlled flight into the terrain. The Class B will be a pilot-induced landing mishap.

As an ex-CCTS instructor pilot and safety officer, I had the pleasure of flying with and meeting hundreds of people who had a part in maintaining and flying the B-52. The aircraft is projected to fly over 100,000 hours in 1987. You can make each of these hours mishap free. Prove the AFISC prediction is invalid, and let's boost the record to *3 Class A and Class B mishap-free years.* ■

C-5

CAPTAIN BEN RICH
Directorate of Aerospace Safety

■ The year 1986 was very exciting for all associated with the C-5, and this energy should continue through 1987. Last year saw the delivery of nine brand new C-5Bs, strong participation from new Air National Guard and Reserve units, and another year of outstanding safety progress.

The big news was the delivery and operation of new C-5Bs at Altus AFB, Oklahoma; Dover AFB, Delaware; and Travis AFB, California. All three bases are fully using their new aircraft, and so far, the track record is excellent. As the remaining new aircraft are phased in, additional A-models will be delivered to Guard and Reserve units.

After starting conversion in 1985, the 433d Military Airlift Wing (MAW) (AFRES) at Kelly AFB, Texas, and the 105th Military Airlift Group, Stewart IAP, Newburgh, New York, are now operational C-5 units, upholding their share of our worldwide airlift commitment. The 439 MAW (AFRES) at Westover AFB, Massachusetts, will receive their first C-5A maintenance trainer in mid-1987 and initiate conversion from C-130s to the Galaxy in late 1987.

Safety made both advances and retreats during the past year, but overall, it was a good year. We experienced our first Class A mishap since 1983, and, as a result, our mishap rate per 100,000 hours of flying time increased slightly from 1.61 to 1.62. The good news is there were no Class B mishaps in 1986, and this is the first year since 1973 we have not experienced a Class B mishap.

We made great progress in decreasing Class C mishaps, cutting the number from 27 reported mishaps in 1985 to 18 last year. Unfortunately, the operators and maintainers can't take all of the credit for this success. A change in AFR 127-4 raised the lower dollar limit for reportable Class C mishaps from $1,000 to $10,000. It will take a few years to fully understand the effect of this change and be able to make accurate judgments concerning our Class C mishap prevention. (See Figure 1 for a breakdown of C-5 mishaps from 1979-1986.)

While we made progress reducing mishaps in logistical and other areas, operations-related mishaps increased sharply (Figure 2).

Logistics Mishaps

Last year saw a dramatic reduction in the number of logistics-related mishaps, but this was primarily due to the modified reporting criteria. It's interesting to note Figure 2 shows the elimination of miscellaneous mishaps as all 14 reported mishaps fall into one of the 4 major categories.

■ Engine malfunctions were reported on three occasions, with one hydraulic failure and fire meeting Class A criteria — our only C-5 Class A in 1986. During an approach on a Pacific training mission, the shoe hold down plate in the No. 1 engine bottom hydraulic pump failed, allowing fluid to leak and be ignited by the engine's hot section. Although the engine's fire detection system failed, the crew received multiple indications of a wing fire after fire traveled back through the engine area and into the pylon. The crew made an immediate emergency landing.

While the other two mishaps met Class C criteria, they could have easily evolved into destroyed aircraft had it not been for timely and effec-

continued

Figure 1
C-5 Mishaps (1979-86)

YR	A	B	C	HAPS	TOTAL
79	0	2	26	21	49
80	1	3	26	23	53
81	0	1	20	15	36
82	1	2	31	14	48
83	2	2	28	18	50
84	0	2	24	14	40
85	0	1	27	19	47
86	1	0	18	7	26

tive aircrew action. In one case, damage from a catastrophic turbine failure on an outboard engine occurred during a heavy weight takeoff (715,000 lbs). After the failure at rotation, the crew executed an immediate emergency return to landing. In the other mishap, the crew's rapid and accurate interpretation of marginally abnormal engine indications during aerial refueling led to the timely shutdown of an engine before severe damage occurred.

■ Flight controls kept our attention during 1986. In the first 4 months, aircrews experienced four reportable malfunctions — one involved the leading edge slats while three involved flap failures.

The single slat failure was a decrease from three mishaps the previous year and involved an asymmetrical condition when the No. 4 right slat failed in the extended position.

The three flap mishaps equaled the number reported for 1985 and occurred for different reasons. In one case, an attach point failure resulted in the left inboard flap streamlining in the airstream. In another, a carriage bolt failure on the right wing resulted in an asymmetric condition without corresponding cockpit indications, and the third occurrence involved a partially detached flap on final approach. All three mishaps terminated with successful emergency landings.

Operations Mishaps

Operator-induced mishaps increased 150 percent, rising from two in 1985 to five in 1986. The only category with more than one event was taxi mishaps. This was also the leading category for operations-related C-141 mishaps. After 2 consecutive years without a taxi mishap, C-5 aircrews taxied aircraft into a hangar and a light pole. Both mishaps occurred at stations "off the beaten path," and both occurred with marshalers providing guidance. This reiterates the need for aircrews to remain aware of their environment — both on the ground and in the air.

Figure 2
C-5 Mishaps by Category (1982-86)

	82	83	84	85	86
LOGISTICS	31.5	29	27.5	35	15
Engines	13	2	4	2	3
Landing Gear	13.5	13	9	15	7
Slats	2	4	0	3	2
Flaps	0	3	0	3	3
Misc (No Trend)	3	7	14.5	12	0
OPERATIONS	2.5	5	0.5	2	5
Taxi	1	2	0	0	2
Misc (No Trend)	1.5	3	0.5	2	3
OTHER	14	16	12	11	7
Bird Strikes	10	5	5	1	2
Cargo Spills	2	6	2	4	3
Physiological	2	2	2	1	2
FOD	0	0	3	2	0
Misc (No Trend)	0	3	0	3	0

(As of 31 December 1986)

The remaining three mishaps involved a main landing gear damaged during an improper kneeling operation, a lightning strike, and jet blast damage to airfield equipment. This is the second consecutive year jet blast has caused reportable damage at a transient airfield.

Other Mishaps

■ During 1986, reported bird strikes doubled from one to two. Fortunately, this is the second straight year encounters with our feathered friends remained at a minimum. Partial credit goes to the aircrews for avoidance of high threat areas when possible and effective clearing.

■ One area of continued serious concern is cargo spills. While reportable events decreased from 4 to 3, the 20 total cargo leaks among the C-5, C-141, and C-130 fleets continue to raise considerable interest. Of the three reported C-5 cargo spills, two resulted in aircraft returning to their departure points and mission delays. Not only are cargo leaks dangerous because of potential fire and corrosion damage, but aircraft lost or damaged or aircrews incapacitated as a result of cargo spills negatively affects our overall combat airlift capability.

■ C-5 crews experienced two physiological mishaps in 1986. One involved hyperventilation by a crewmember while the second resulted from smoke and fumes emitted from a faulty pressurization and air conditioning system.

■ A good note is the C-5 fleet didn't sustain any reportable FOD mishaps last year — a tribute to crew awareness and excellent ground support.

Future Outlook

The future for the C-5 is bright and exciting. As more C-5Bs are delivered and additional AFRES and ANG units transition to the A-model and join "Big MAC," our experience base will build at an increasing rate. Past problem areas should disappear as A-models are upgraded, and the cumulative mishap rate should continue to decrease. However, for this to happen, we all must continue to work hard by accurately reporting discrepancies and striving to ensure hazards are abated. ■

C-9

MAJOR DOUGLAS J. MILLER
Directorate of Aerospace Safety

■ The USAF C-9 fleet completed another Class A and B mishap-free year in 1986. In over 480,000 hours and 18 years of operation with the Air Force, the C-9 fleet has only experienced 2 Class As and one Class B mishap. Crewmembers, supervisors, and maintenance people should be proud of their professional efforts in achieving this record.

1986 Mishaps

In 1986, the three C-9C special air mission (SAM) aircraft had no Class C or high accident potential (HAP) mishaps. The C-9A aeromedical evacuation aircraft experienced seven Class C flight mishaps and four HAP mishaps. These incidents included six engine-failure mishaps, two flight instrument-related mishaps, a fuel leak, a physiological mishap, and a taxi mishap.

■ Of the six engine failure mishaps, one was a dual-engine failure. This occurred when a C-9 touched down in slush, flaming out both engines. Three of the five single-engine mishaps were due to engine turbine failures. Of the other two, one flameout was caused by a sheared shaft in the engine driven fuel pump, and the other was a jammed throttle caused by a worn and binding throttle cable.

There was an increase in engine failures in 1986 over recent years. As our C-9 aircraft get older, we must anticipate and be prepared for more system problems. We can minimize these problems, however, by the use of thorough maintenance and preflight inspections.

■ In our two flight instrument-related mishaps (dual ADI failures), we were fortunate neither occurred in adverse weather. These mishaps remind us flight instruments with backup systems *can* fail simultaneously. Are you prepared to fly "needle, ball, and airspeed" in the weather?

■ Our taxi mishap was a classic case of a number of minor misunderstandings and mismarkings (i.e., a misleading taxi line, vehicle unintentionally parked near a taxi line, etc.) which added up to an aircraft/vehicle collision. Care in ensuring aircraft/obstacle clearances cannot be overemphasized.

Air Traffic Hazards

Four C-9s were involved in hazardous air traffic report (HATR) incidents in 1986, down from eight in 1985. Considering the multiple sortie missions and operations into high density air traffic airfields, these HATR incidents identify the need for a high state of awareness in clearing and close monitoring of aircraft radios.

The tragic midair collision of a civilian DC-9 and a light aircraft in 1986 highlights the importance of see-and-avoid. The Air Force C-9 fleet has improved its potential to be seen with the installation in 1986 of strobe lights.

The Future

The C-9 air evac and the C-9C SAM are both demanding missions. The motivation to accomplish many urgent missions is strong. However, the tendency to press weather and other limitations must be avoided to accomplish the mission safely.

C-9 maintainers and operators have much to be proud of. With the same high level of commitment made in 1986, you can continue to keep the C-9 safety record outstanding in 1987. ■

T-43/C-22

CAPTAIN BEN RICH
Directorate of Aerospace Safety

■ For the first time, this publication will review the safety history of the T-43 and C-22, two aircraft that have proved very reliable. Last year, neither system experienced a Class A or Class B mishap, while both fleets experienced one Class C.

Like the C-9 fleet, the T-43 and C-22 are off-the-shelf commercial aircraft converted to military specifications. The T-43 is primarily used for undergraduate navigator training and personnel transport while the C-22 is primarily a personnel transport. These missions are similar to the profiles flown by their civilian counterparts, the Boeing 737 and 727.

T-43

The T-43, older of the two aircraft in terms of military service, is the military version of the Boeing 737-200. The T-43's first flight was in 1973, and the delivery of 19 aircraft was completed in 1974.

Mishap History

Since its introduction, the T-43 fleet has accumulated over 200,800 hours without a Class A mishap. In its 13-year history, the T-43 has accumulated 6 Class B mishaps and 59 Class Cs. Prior to 1986, Class C dollar reporting criteria ranged from $1,000 to $100,000. However, the lower limit was increased from $1,000 to $10,000 last year and should result in a decrease in the number of Class C mishaps reported annually. The T-43 fleet has also experienced four HAPs. Figure 1 summarizes the last 7 years.

The six Class B mishaps all resulted from bird strikes and tire failures. The 59 Class C mishaps have resulted from a variety of reasons, and Figure 2 shows the primary trouble

Figure 1

	T-43A Mishap Class				C-22A Mishap Class			
YR	A	B	C	HAPs	A	B	C	HAPs
80	0	1	2	0				
81	0	0	7	0				
82	0	0	8	2				
83	0	0	8	1				
84	0	0	2	0	0	0	1	0
85	0	0	3	0	0	0	0	0
86	0	0	3	0	0	0	1	0

Figure 2
T-43A Class C Problem Areas

	80	81	82	83	84	85	86
Bird Strikes	2	0	0	2	0	0	0
Tire Failures	0	0	0	0	0	2	0
Physiological	1	1	3	1	1	1	2
Engine Failure/Shutdown	0	3	1	0	0	0	0
Fire Overheat System Failure	0	1	3	0	0	0	0
Other Miscellaneous	0	2	3	6	1	0	1
Total	3	7	10	9	2	3	3

areas for Class Cs for the period 1980-1986. These include bird strikes, tire failures, physiological mishaps, and engine failures and shutdowns for various causes. The remaining 13 mishaps were the result of unrelated miscellaneous causes.

1986 Mishaps

Last year was relatively quiet, with only three Class C mishaps reported. Two were physiological mishaps, and the third mishap involved a gyro-system induced, attitude-indicator failure that resulted in an unusual attitude and near departure from controlled flight. The mishap started at 33,000 feet in instrument meteorological conditions (IMC), and the aircrew recovered the aircraft at 10,500 feet in a high speed buffet. The entire maneuver took place in IMC, and the aircraft commander used needle, ball, and airspeed in the recovery after the aircraft apparently performed a modified Split-S.

The Future

The future of the T-43 is promising based on aircraft performance with civilian air carriers. We should continue to see high reliability from the aircraft, and any potential problem areas will be anticipated based on the experience of our civilian partners.

C-22

In the early 1980s, the Air Force recognized a requirement to fill special transportation needs. Previously, T-43 aircraft had been used in this capacity, but the T-43s were to be returned to Mather AFB, California, and Buckley ANGB, Colorado, to support navigator and airmanship training requirements.

A review of available aircraft concluded the best replacement for the T-43 was the Boeing 727-100 which was readily available on the used aircraft market for a reasonable price. The final result was the purchase of six used 727s, designated the C-22. Four aircraft have been reconfigured and modified to military specs. Three are stationed with the Air National Guard at Andrews AFB, Maryland, and one is at Howard AB in the Canal Zone. Two aircraft are still to be delivered.

Mishap History

In the 3 years of service, the C-22 fleet has accumulated over 2,250 hours of flying time, with only one reported operational Class C mishap (Figure 1). The Class C report filed in 1984 occurred during contractor activity, not as a result of military actions.

The sole operations-related Class C mishap occurred last year when a 25-man life raft inflated inside the aircraft while at cruise altitude. The raft, which was stowed on the cabin floor, inflated when a passenger inadvertently triggered the inflation handle with his foot. This particular raft didn't have the protective cover in place and inflated normally after the handle was triggered.

As the raft consumed everyone in the immediate vicinity, a quick thinking passenger vigorously attacked the latex monster with a pocket knife, depleting its life-giving force. While the affected passengers were saved from the killer raft by these timely actions, the raft suffered irreparable damage.

The Future

Now that we have the raft problem under control, the future of the C-22 is bright and exciting. The Air Force aircraft are relatively low-time compared to the civilian counterparts and should remain a viable part of the Air Force fleet for several years. The safety record of the Boeing 727 is strong evidence the C-22 will remain one of the Air Force's safest aircraft. ■

C-130

MAJOR DOUGLAS J. MILLER
Directorate of Aerospace Safety

■ Air Force C-130 operators and maintainers produced an excellent safety record in 1986 while accomplishing many demanding missions. Over 363,000 flying hours were logged in 1986 which brought the total for the Air Force C-130 fleet to more than 10,900,000 hours.

This article will present some of the lessons learned from the C-130 mishaps which occurred in 1986. We'll also look at some trends and other safety issues those of us in the C-130 world face.

Class A Mishaps

There were two Class A mishaps in 1986. One occurred when a C-130 broke up while flying a low-level route in turbulence. All 11 on board died in this tragedy. In the other Class A, a power malfunction during a touch-and-go landing resulted in a loss of aircraft control. Three of five on board perished in the post-impact fire. Operations factors were involved in both of these mishaps; logistics was a factor in the latter.

Class B Mishaps

There were no Class B flight mishaps in 1986.

Class C and HAP Mishaps

C-130 Class C and high accident potential (HAP) flight mishaps decreased from 238 in 1985 to 134 in 1986. This dramatic decrease can be attributed to a change in the minimum cost of a Class C mishap from $1,000 to $10,000 as defined in AFR 127-4, "Investigating and Reporting US Air Force Mishaps."

C-130 Mishap Summary

	1985	1986
Class As	**3**	**2**
Rate/100,000 Flight Hours	.8	.5
Destroyed	2	2
Fatalities	27	14
Class Bs	**2**	**0**
Rate/100,000 Flight Hours	.5	0
Class Cs and HAPs	**238**	**134**
Rate/100,000 Flight Hours	62	37
Bird Strikes	41	9
FOD	25	5
Physiological	25	21
Lightning Strikes	17	13
Foam Fires	15	4
Two Engine Shutdowns	12	5
Flight Control Malfunctions	9	4
Dropped Objects	9	3
Cargo Leaks	4	3

Even with the change in reporting criteria, there were some very positive trends that could be identified in 1986 Class C/HAP statistics. For example, two-engine shutdowns (which must be reported regardless of cost) decreased from 12 in 1985 to 5 in 1986.

■ Fuel foam fires, which must also be reported regardless of cost (because of our special reporting criteria), dropped from 15 in 1985 to 4 in 1986. Thanks to this positive improvement (due to the yellow foam with impingement cages and lower refueling pressures), special reporting procedures for foam fires will no longer be required.

■ There was also a decrease in the number of physiological mishaps in 1986. Of the 21 physiological mishaps, the most common were ear and sinus blocks. The second most frequent physiological mishaps involved injuries to the crewmembers while trying to move around the cargo compartment during flight. Though a few might have been avoidable, those are generally the type of mishaps we can prevent through care and common sense.

■ Flight control mishaps decreased between 1985 and 1986. In one of our 1986 mishaps, we were extremely lucky the aircraft was on

the ground. The cylinder body of the dual rudder boost actuator fractured, resulting in the loss of both booster and utility hydraulic systems. As our C-130s get older, we must be prepared to deal with unusual system failures. We can minimize these by thorough maintenance and preflight inspections.

■ Another very close call occurred in 1986 when a breakdown in communication resulted in a C-130, which was trying to stay in formation below the weather, almost stalling into a ridgeline. This mishap highlighted the fact even highly qualified crews with thorough preflight planning can find themselves in a serious predicament when vital information between formation members is not passed clearly and rapidly.

■ We had some taxi mishaps in 1986, including a wingtip strike to a building and an aircraft rolling over a fire bottle. It is hard to find a good excuse for a taxi mishap.

Lessons Learned

There are some valuable lessons to be learned from the Class A mishaps which took place in 1986 that can lessen the possibility of future tragedies. From an engineering analysis of our first Class A mishap, the major factors which resulted in the aircraft breakup were turbulence severity and penetration airspeed. Since stress on the wing results from lift and in the equation for lift, velocity is squared, turbulence-caused stress can be minimized by carefully monitoring your penetration airspeed.

C-130 aircrews *must* avoid severe turbulence. Those of you who frequently operate in areas where moderate turbulence is common need to be familiar with terrain features which accentuate turbulence as well as the weather phenomena which produce it.

Our second Class A mishap gives us cause to carefully review forces which affect minimum control airspeed. Most of the time if something goes wrong during the landing phase, the correct solution is to push the power up and go around. However, there are situations when asymmetrical power produced on three good engines is going to exceed your flight control authority. Keeping in mind "What's the worst thing that could happen to me now?" and "How would I handle it?" when things are calm might save your life if that moment of terror ever does occur.

Safety Improvements

■ Turning to safety "health" of the C-130 airframe, the situation continues to improve. The outer-wing modification for C-130E and B-model aircraft is well over two-thirds complete. Warner Robins ALC has prioritized all remaining C-130s so ones that have received the most severe treatment will be modified first.

■ There are other safety modifications in progress. More than one-half of the C-130 fleet has been modified with crash survivable cockpit voice recorders, and solid-state flight data recorders are presently in the trial installation phase. With this equipment, crew actions and crash parameters will be known so faulty equipment can be identified and corrected. This should minimize "cause undetermined" mishaps which have a negative impact on aircrew morale and confidence in their aircraft.

■ Strobe lights will eventually be installed on the C-130 fleet. Trial installation of fuselage strobe lights is projected for 1987, with a mod completion estimate of 1991. Strobe lights will decrease midair collision potential and, therefore, improve the safety of C-130 flight operations.

■ A safety modification we may be seeing in the not-too-distant future is some form of ground proximity warning system (GPWS). Funds ($7.6 million) have been allocated in the FY87 budget for GPWS for passenger-carrying Air Force transport aircraft. This would be a welcome improvement for the C-130 fleet when you consider 22 of our Class A mishaps have been controlled flight into terrain.

■ Improvements in C-130 flight simulator training provide a very positive safety enhancement for the Air Force C-130 fleet. Mission oriented simulator training with aircrew coordination training is giving many of us the opportunity to improve our crew coordination. These skills can tip the balance between "catastrophe" and "a close one" in critical situations. It is my hope in the near future all C-130 aircrews will have the benefit of this program.

The Future

In the past few years, many positive steps in both operations and maintenance have been taken to improve flight safety in the C-130 fleet. As you can see, continuing improvements are underway, and the results have been a low C-130 fleet flight mishap rate in 1986.

The final element in this equation for flight safety is you, the C-130 operators and maintainers. If we can continue to give it our best, 1987 can be an even better year! ■

C/KC-135

MAJOR RAY GORDON
Directorate of Aerospace Safety

■ In 1986, the C/KC-135 fleet passed a major milestone with 30 years of distinguished service to the Air Force. The 135 fleet performs a wide variety of missions including air refueling, airlift, reconnaissance, weather surveillance, testing, administrative support, airborne command post, and radio relay.

The importance and vitality of this versatile weapon system is evident in that over $13 billion is programmed in the next 5 years for improvements and needed modifications. It is expected the 135 will be flying proudly well into the next century.

Operators and maintainers can be proud of the excellent safety record posted for the C/KC-135 in 1986. This article will present a brief Class A mishap history, review the 1986 mishaps with some of the trends and lessons learned, and highlight some of the other safety concerns which we in the 135 business now face.

Class A Mishap History

Of the 808 aircraft produced for the Air Force by Boeing, 741 remain in active service. Of the 67 no longer in service, 57 were destroyed in flight mishaps, and 6 more were lost in non-flight mishaps. Figure 1 shows the number of Class A flight mishaps and rate per 100,000 flying hours.

Figure 1
Flight Mishap History (1957-86)

Total Flying Hours	8.7 Million
Class A Mishaps/Rate	70/0.81
Destroyed Aircraft/Rate	57/0.66

At current flying usage, the 0.81 rate equates to about 2 mishaps per year. However, in the last 10-year period, the rate has dropped to 1.4 mishaps per year. Although not counted towards the 135 rate, the 135 has also been involved in 17 other Class A mishaps, occurring primarily during air refueling operations. Each one of us, either operator or maintainer, has the responsibility and capability to make that rate go even lower.

As you might expect, takeoff, landing, and air refueling account for the three highest categories of Class As, making them "critical phases of flight" — for good reason. Of the 87 Class As, these 3 categories account for two-thirds of all mishaps.

Figure 2
Class A Mishaps

Takeoff		26
Landing		19
Air Refueling		13
w/drogue	(7)	
w/boom	(6)	

Primary causes for takeoff mishaps include engine failures, aborts, controlled-flight-into-terrain (CFIT) mishaps, and stalls. Causes for landing mishaps include CFITs, pressing minimums, and hard landings.

Drogue/probe air refueling mishap causes include off-center disconnects, fuel ingestion from hose separations, nozzle failures, and receiver overcontrol problems. Boom/receptacle air refueling mishap causes include receiver underruns and brute force disconnects. You will find a more complete discussion of 135 Class A mishaps in

the April 1986 *Flying Safety* magazine.

1986 Class A Mishap

For 1986, AFISC predicted one aircraft would be destroyed because of a CFIT landing mishap. Sadly, one KC-135A did crash — with four fatalities — after the crew attempted to land from too high above the PAR glide slope. The subsequent hard landing was severe enough to separate one of the engines, resulting in hydraulic failure, electrical disruption, and fire on the wing. During the go-around, the aircraft stalled. No mechanical problems were found.

This mishap tells us we need to look at training requirements and aircraft commander supervisory responsibilities. During the last 30 years, three other Class A mishaps with six fatalities have occurred due to hard landings.

Class B Mishaps

For the second year in a row, there were no Class B mishaps.

Class C and HAP Mishaps

In 1986, the dollar minimum for Class C reporting increased from $1,000 to $10,000. This changed because of the ever-increasing cost to repair damage. Many of us in the safety community were apprehensive about losing valuable mishap prevention information because of this change. Not surprisingly, the Class C mishap total dropped in 1986 by 32 reports — from 92 in 1985 to 60 in 1986. However, the number of high accident potential (HAP) reports increased by 16 — from 29 in 1985 to 45 in 1986!

That tells us one thing — flight safety officers and their commanders recognize the importance of "getting the word out" for low-damage incidents with an important safety message. This is what mishap prevention is all about, and we commend you for getting the job done!

In 1986, there were 105 Class C and HAP mishaps reported. That compares to 121 reported in 1985.* Of the 105 mishaps, logistics-related causes accounted for 51 percent, of which one-third were caused by maintenance personnel error. Operations accounted for 24 percent, of which one-half were caused by crew error during air refueling. I will discuss some of these in greater detail later. See Figure 3 for a comparison of categories with the greatest number of mishaps.

*These totals include drogue air refueling mishaps with KC-135s reported by the Navy and Marines; eight in 1985 and five in 1986.

Figure 3
Most Common Class C and HAP Mishaps

	1985	1986
Air Refueling	30	20
Bird Strike	18	12
Physiological	6	11
Flight Controls	6	10
Engines	11	9
Pressurization	12	8

■ **Air Refueling** Air refueling again accounted for the greatest number of mishaps. Compared with the 27 mishaps in 1985, all operations-caused categories decreased. Five fighter, 4 heavy, and 4 probe and drogue mishaps accounted for the 13 ops mishaps, and only 5 of these had reportable damage! Keep up the good work!

The air refueling systems category saw an increase from three to seven mishaps. Five of these involved logistics factors on the aging boom system. Efforts are now underway to upgrade the system with a new boom which will be faster, more reliable, more controllable, and will incorporate a new nozzle with an independent disconnect system.

One of the other systems mishaps, still under investigation, involved fuel leaks from the drogue coupling while refueling Marine A-4s. The other was an OA-37 engine flameout due to fuel ingestion during disconnect. SAC is proposing a hose reel system initiative to replace the boom drogue adapter (BDA) on a selected number of

continued

tankers. I know many people in the Navy are keeping their fingers crossed!

■ **Bird Strikes/Physiological** Reportable bird strikes continued a downward trend again in 1986; however, physiological mishaps continued an upward trend. In addition to the 11 physiological episodes, we also experienced 6 pressurization and 2 electrical mishaps where individuals experienced physiological symptoms. Six of the 11 physiological mishaps involved RC-135 mission crewmembers. The fact is, if you don't feel well, don't fly — see the flight surgeon first. Pressurization system failures are still too high and include three cases of the bends.

■ **Electrical** In both of the electrical mishaps, crewmembers were exposed to toxic smoke and fumes. In most commands with 135s, crews will see improved quick-don oxygen masks with ventilated smoke goggles and smoke hoods to help in these kinds of emergencies.

■ **Flight Controls** Flight control mishaps also continued an upward trend. Last year, we recorded 10 HAPs: 3 flap, 2 each for rudder, elevator, and autopilot, and 1 aileron. This year, some units will see the new solid-state autopilot which should alleviate uncommanded autopilot inputs.

■ **Engines** Engine mishaps have remained fairly constant over the past few years. In 1986, maintenance personnel error caused two of the nine engine mishaps. We are monitoring a trend of premature failures with TF-33-P102 turbine wheels, as well as the J57-59 compressor reblade program, which should be complete by FY89.

■ **People** If we exclude air refueling mishaps, *people* directly caused almost a third of 1986's mishaps. Most of these were preventable. In maintenance units, personnel error caused four of six hydraulic and three of six FOD mishaps.

In ops units, there is a disturbing trend in landing mishaps. Three engine pod scrapes occurred when the pilots failed to go around soon enough in spite of instability on short final. One crew failed to compute crosswind correctly and tried to land with the wind out of limits.

These mishaps are especially disturbing since one of 1985's Class A mishaps started with a pod strike. Don't let pride in your ability to land this airplane prevent you from taking it around if it doesn't look right!

Three other crews ran their aircraft off the runway. Two crews, when stopping distance was critical, underestimated their landing ground roll; one did not use full braking upon reaching the three-point attitude.

Another crew miscomputed landing ground roll on a slush-covered runway and raised the flaps to prevent damage, further increasing their ground roll.

The third crew ran off the runway because they misunderstood a civilian tower's instructions. During a planned touch and go, tower denied clearance for the touch and go, and the crew had to abort at high speed.

Another crew error mishap took place in the chocks. During preflight, the crew failed to ensure all the fuel boost pumps were on and took off in that configuration. As they climbed through 26,000 feet, fuel flow became erratic, and three engines flamed out from fuel starvation. Fortunately, their airstart procedures were good.

Looking back at the mishaps of 1986, the easy ones to fix are logistics related. All it takes is money. However, to fix the problems that will make us money in operations takes the dedication and professionalism of all of us — crews, supervisors, and senior officers. It's a challenge we can meet.

Current Safety Concerns

■ **GPWS** We believe a second-generation ground proximity warning system (GPWS) is currently the most important and beneficial safety enhancement for the 135 fleet. If GPWS is installed, 10 CFIT mishaps can be averted during the remaining expected life of the fleet. In addition, stall warning (another major safety issue) and wind shear warning software can be integrated into the GPWS vey easily. Congress and the Air Staff support modification.

■ **Hose Reel System** We support initiatives to replace the BDA with a hose reel system. The BDA is a poor performer and has a disproportionate share of air refueling mishaps. SAC and Air Force Systems Command are working to retrofit a selected number of tankers.

■ **Flight Data/Cockpit Voice Recorders** We believe safety investigations could be enhanced and money saved if this equipment is installed. SAC supports this equipment in a new KC-135 avionics modernization proposal.

■ **Strobe Lights** We support the acquisition of strobe lights for midair collision avoidance. The most recent effort to get a strobe light mod has been delayed by Air Force Logistics Command for administrative reasons.

■ **Smoke and Fume Protection** We will monitor upcoming in-flight validation of current smoke and fume elimination procedures in the 135. As mentioned previously, most commands are acquiring improved quick-dons with ventilated smoke goggles and smoke hoods.

1987 Expectations

This year, we predict one Class A pilot-induced landing mishap and one Class B engine mishap. This prediction reflects past mishaps, current trends, and changes in the way we support, maintain, and operate the 135 fleet.

You can prove our prediction wrong! You have done it in the past, and you can do it again. Commit yourself to doing your job to the best of your ability. Everybody else is counting on you! ■

C-141

CAPTAIN BEN RICH
Directorate of Aerospace Safety

■ Last year can only be reviewed with mixed emotions in terms of safety achievements by the C-141 fleet. Great advances were made in several areas, but a few failures overshadowed our successes. The C-141 fleet experienced one Class A mishap, its second in 3 years. However, this aircraft remains one of the safest airlifters in Air Force history, with a mishap rate of .38 mishaps per 100,000 hours of flying time. (See Figure 1.)

We didn't experience a single Class B Mishap in 1986, extending our record to 3 consecutive years without a Class B mishap.

Our Class C mishaps, always our highest category, dropped from 84 in 1985 to 42 in 1986. This is primarily due to the change in reporting criteria which elevated the lower reporting limit from $1,000 to $10,000. High accident potential (HAPs) items also dropped from 55 to 39. (See Figure 2.)

Several areas of improvement included tail scrapes, flight control malfunctions, thrust reverser malfunctions, and miscellaneous operations-related mishaps. Unfortunately, cargo spills, physiological incidents, and taxi mishaps remain a problem.

Logistics Mishaps

We saw slight improvements in all logistics-related areas except engine thrust reversers, where we saw total elimination of previous problems. The drop from 17 to zero reflects the outstanding support from the maintainers in solving our reverser problems. Our only reported landing gear malfunction involved a blown tire on takeoff, while brake malfunctions involved improper maintenance in one case and hydraulic problems in the other two.

Flight control malfunctions accounted for eight Class C mishaps, a 33 percent decrease from 1985. There were no specific components involved with the mishaps, as cause areas included spoilers, autopilots, elevator computers, ailerons, pitch trim, rudder power units, and aileron tabs. Four of the mishaps resulted in abrupt altitude losses.

While the number of reported brake problems dropped, we closely monitored the antiskid system refit. Operational restrictions and reversion to the old analog system eased the impact until the fleet could be refitted with a new modified digital system.

While the number of logistics-related mishaps decreased over 50 percent in 1986, it will take a few years of reporting under the new

continued

Figure 1
Cargo Aircraft Class A Mishap Comparison

AIRCRAFT TYPE	YEARS	MISHAPS	HOURS	CUMULATIVE RATE
C-124	50-74	132	6,627,613	1.99
C-5	68-86	13	803,263	1.62
C-130	55-86	130	10,974,184	1.18
C-135	57-86	70	8,682,650	.81
C-9	68-86	2	482,527	.41
C-141	64-86	29	7,721,132	.38
T-43	73-86	0	200,896	0.00
C-22	84-86	0	2,288	0.00

(As of 31 December 1986)

Figure 2
High Accident Potential Comparison

YR	A	B	C	HAPS	TOTAL
79	3	4	90	103	200
80	1	0	109	123	233
81	1	1	73	66	141
82	1	0	66	74	141
83	0	2	77	73	152
84	1	0	73	49	123
85	0	0	84	55	139
86	1	0	42	39	82

criteria to make an accurate judgment concerning our progress.

Operations Mishaps

Statistically, 1986 was a good year as we saw a decrease in mishaps in almost every category. Unfortunately, our only Class A mishap was a taxi mishap that resulted in severe damage and loss of a C-141 for several years. In fact, the three reported taxi mishaps involved four C-141s (one collision involved two C-141s).

Since 1 January 1981, the Air Force has experienced 70 reported pilot-induced taxi mishaps, of which 21 involved MAC aircraft. The C-141 is second among all aircraft with 9 ground mishaps in the last 6 years, behind the F-4 which has accumulated 16 mishaps.

This problem has received increased emphasis, and actions are being taken to eliminate it. One obstacle has been accurate reporting of taxi mishaps. Previously, if mishaps didn't meet dollar criteria, the individual safety function could decide whether to report the incident as a HAP. Several ground mishaps went unreported because of this loophole.

MAC has instructed that all taxi mishaps be reported, either under the appropriate dollar criteria or as a HAP if the damage is less than $10,000. This will give a clearer picture of the problem and aid us in finding the solution.

As you can see in Figure 3, aerial refueling mishaps is the only area which increased. While the volume of initial and line refueling training is tremendous, we must still strive to decrease this number.

Other Mishaps

Mishaps attributed to other than logistics and operational causes decreased by only 30 percent, compared to 47 percent and 52 percent for logistics and operations, respectively. The largest accomplishment involved the 74 percent decrease in reported bird strikes. This can be attributed to crew awareness and improved flight planning for avoidance of hazardous areas.

Engine damage from foreign objects decreased from nine to six reported events while miscellaneous events were cut in half.

Two areas of continued concern are cargo spills and physiological mishaps. Cargo spills remained almost constant from the previous year and primarily involved improper packing and loading of hazardous materials.

Besides the 11 reported spills, 3 physiological mishaps were caused by cargo spills and bring the true number of reported spills to 14. In almost all cases, the mishaps involved fumes which forced crews to don oxygen masks to combat the problem.

Leaks included fuels from engines, drones, fighter external tanks, trucks, helicopters, power units, paint from ruptured cans, and paint not marked but hidden in a tool kit on a personal possession pallet. As a result, three aircraft returned to their point of departure, and four missions diverted to en route stations. The hazard potential of cargo spills can't be understated.

The Air Force can't tolerate the loss of an aircrew or aircraft and resulting impact on airlift capability because of improperly prepared cargo. All of us, both aircrews and support personnel, must participate to abate this problem.

The number of physiological mishaps increased slightly, from 15 to 17, but one must review the reasons to understand the full problem. Besides the three mishaps caused by cargo leaks, other causes included injuries incurred during aircraft maneuvering (two), decompressions caused by failed number-two escape hatches (two), hydraulic leaks in the cargo compartment (two), crew-caused injuries (three), and five mishaps attributed to various unrelated reasons.

Figure 3
Mishap Comparison by Category

	1981	1982	1983	1984	1985	1986
LOGISTICS	76	60	53	60	57	30
Flt Cont/AP	37	18	13	14	12	8
Landing Gear	24	10	18	7	3	1
Engines/TRs	0	0	0	4	17	0
Brakes	0	0	0	5	6	3
Misc (No Trend)	15	32	22	30	19	18
OPERATIONS	15	13	23	18	23	11
Taxi Mishaps	5	1	3	1	4	3
AR	4	2	3	2	2	3
Tail Scrapes	3	2	8	1	6	0
Misc (No Trend)	3	8	9	14	11	5
OTHER	50	68	76	45	59	41
Cargo Spills	19	29	31	5	12	11
Bird Strikes	15	20	25	15	19	5
Engine FOD	7	8	10	8	9	6
Physiological	7	6	2	5	15	17
Misc (No Trend)	2	5	8	12	4	2

(As of 31 December 1986)

C-141 Safety Record and Expectations

The C-141 remains one of the safest aircraft in history. The credit for this outstanding record goes, appropriately, to the operators and maintainers who ensure the C-141 fleet is constantly ready to deliver cargo anywhere in the world.

The diverse range of missions, from special operations at low level to high altitude, long range, and from aerial refueling to personnel and equipment airdrops, puts a tremendous strain on the aircraft and the people. It will take both ground support people and aircrews to accurately report and effectively fix hazards and discrepancies to maintain this aircraft's exemplary safety record as the safest airlifter in history. ■

E-3

MAJOR RAY GORDON
Directorate of Aerospace Safety

■ In 1986, the USAF E-3 community completed another year free of Class A or B mishaps! With over 200,000 hours of service since becoming operational in 1977, the E-3 has not experienced a Class A mishap. We also improved in the number and relative seriousness of Class C mishaps. Congratulations!

A comparison between 1985 and 1986 Class C and high accident potential (HAP) flight mishaps follows:

E-3 Class C and HAP Mishaps

	1985	1986
Physiological	1	3
Pressurization	0	2
Dropped Object	3	1
Electrical	6	0
	10	6

Physiological/Pressurization Problems

In 1986, there were three physiological episodes: One passenger flew with an infected ear resulting in an ear block; one crewmember had flu symptoms; and another crewmember had food poisoning.

In both pressurization mishaps, cabin pressure was lost because of a design deficiency in the forward forced air cooling valve. Water is able to accumulate and freeze at altitude, allowing air to force the valve open and depressurize the aircraft. Air Force Logistics Command (AFLC) is working to fix this problem.

The dropped object was a life-raft door lost because of a misrouted actuator cable.

Electrical Problems

Progress has been made in correcting 1985's electrical problems. The switchlight modification, which replaces defective switchlight modules to eliminate electrical fires, has just been completed.

Wing actions to eliminate water contamination of oil in the integrated drive generators have been effective, pending permanent AFLC corrective actions.

Cabin Fire/Smoke Concerns

The potential for other electrical malfunctions, accompanied by fire and smoke, is definitely a safety concern. Emergency egress from a cramped, smoke-filled cabin may someday be necessary. The Block 20/25 modification, which adds 5 new radar operator consoles, will only add to the cramped conditions.

The wing is investigating emergency escape path lighting as a beneficial safety enhancement. These floor-mounted lights have life-saving potential and are now required on commercial aircraft. We encourage these efforts.

Recent civilian and military mishaps which involved fatalities because of smoke and fumes have highlighted deficiencies in the way we in the Air Force do business. We support continued action to procure quick-don oxygen masks with ventilated smoke goggles and smoke hoods for the E-3.

Ground Proximity Warning System

Another modification we think extremely important for the E-3 is the addition of a ground proximity warning system (GPWS). Based on the mishap history of aircraft with similar flight profiles, we forecast one or two controlled-flight-into-terrain mishaps during the E-3's expected life if GPWS is not procured. Congress and the Air Staff support modification, and direction for this mod will be forthcoming soon.

1987 Forecast

Again, for 1987, our Class A forecast for your E-3 is "zero." However, as we see year after year in other weapons systems, mishaps can happen when and where you least expect them. No one is immune. Each one of you knows where the possibilities could exist — landing, takeoff, or maybe a midair.

Your professional attitude and hard work paid off in 1986. With *your* help, this year can be even more successful! ■

KC-10

MAJOR RAY GORDON
Directorate of Aerospace Safety

■ On 2 December 1986, KC-10 number 50 was delivered from the McDonnell Douglas factory to Seymour-Johnson AFB, North Carolina. The last aircraft, number 60, should be delivered by early 1988.

The KC-10 continues to exceed expectations in operational capability and reliability. Since its first flight in 1981, the fleet has flown approximately 98,500 hours, of which 32,500 were flown in 1986.

The fleet's safety record is excellent. There have been no Class A mishaps and only one Class B engine FOD mishap in its history.

In 1986, this safety success story continued with no Class A or B mishaps and a decrease in Class Cs and HAPs. This article will address the safety issues of the past year.

Class C Mishaps

In 1986, 12 Class C and high accident potential (HAP) mishaps were reported which involved the KC-10. In comparison, 1985 had 20 reports. The summary shows decreases in most of the categories.

KC-10 Class C and HAP Mishaps

	1985	1986
Air Refueling	11	7
FOD	1	2
Bird Strike	2	1
Antiskid	0	1
Jet Blast	0	1
Tires	2	0
Physiological	1	0
Dropped Object	1	0
Flight Controls	1	0
Depart Taxiway	1	0
Total	20	12

Of seven air refueling mishaps, four involved malfunctions of the probe and drogue system (these include three Navy/Marine reports). Two of these were failures of the hose reel takeup system. If this system fails when the receiver makes contact, the slack created results in a severe hose oscillation which can sever the hose at the drogue coupling or break the receiver's probe.

■ One mishap caused F-14 engine damage due to fuel ingestion, and another broke an F/A-18 probe. Because of similar mishaps, Air Force Systems Command (AFSC) and McDonnell Douglas are designing an electronic hose reel monitoring system which will provide a continuous status of the retract mechanism, hopefully eliminating these mishaps. The first retrofit is planned for aircraft number 60.

■ In another mishap, the hose would not retract because of a failed rewind solenoid valve. When the boom operator tried to jettison the hose, the cartridges on the guillotine failed to produce enough force to cut the hose, and the crew had to land with the hose in trail.

■ In another mishap, a part on the AV-8 nozzle remained with the drogue coupling. Again, AFSC and the contractors are investigating these problems.

■ Three air refueling mishaps occurred with the boom system. Of these, two involved personnel error. On one, the boom struck an F-4 receiver after an upper limit automatic disconnect and shattered the rear canopy.

■ Another mishap occurred during a radio-silent night refueling. As the C-141 receiver approached an in-

ner limit, a disconnect was made, but the receiver continued to move forward and struck the ice shield. No breakaway call was made. Radio-silent or not, it is the boom operator's responsibility to make the breakaway call to prevent a mishap.

■ The last boom mishap occurred with an F-4. The bolt which retains the nozzle on the boom had stripped threads. Consequently, the receiver returned to home base with the boom nozzle still attached.

In addition to air refueling mishaps, other mishaps caused damage greater than the Class C $10,000 minimum. Of the two FOD mishaps, one involved a small tool left in the engine by maintenance personnel; the other was a strobe light lens which was ingested during flight by the tail-mounted engine. A bird strike by a seagull on a leading edge slat also caused Class C damage.

High Accident Potential Mishaps

The two remaining incidents were reported as HAPs. A reversed wire on the antiskid system caused a tire blowout on landing. In the other HAP, jet blast from a taxiing KC-10 moved a maintenance stand, with maintenance people aboard, into a parked B-52.

Future Expectations

The only major modifications being considered right now deal with the air refueling systems. The hose reel monitoring system has already been mentioned. Dual wing-mounted air refueling pods are also planned which will add multiple-point drogue capability to the fleet.

For the boom system, an aural tone generator will key boom operators when contacts and disconnects have been made so they won't have to look away from the receiver.

Again, we forecast no KC-10 Class A mishaps in 1987. However, we will see continued growth of the fleet, a larger and younger crew force, and more operational commitments. These factors will place added pressure on the "operations" community. As we see in other weapons systems, no one is immune to making mistakes. Hard work and professional attitudes are keys to preventing the "operations-caused" mishap.

In the past, your hard work has earned an excellent safety record of which you can be proud. Make 1987 another outstanding year! ■

Helicopters

PHILLIP T. SIMPSON
Directorate of Aerospace Safety

■ The Air Force lost six people in helicopter mishaps in 1986. This was an improvement over the seven fatalities in 1985; however, we destroyed three helicopters, one more than we did in 1985, and heavily damaged another. The aircraft involved were the HH-53C, MH-53H, CH-53C, and TH-1F. The Huey mishap accounted for five of 1986's fatalities, while the HH-53C and CH-53C mishaps involved minor injuries but no fatalities.

There were 105 Class C mishaps and HAPs, a 10 percent increase over the previous year's 96. The 1986 mishap experience by aircraft category is shown in Figure 1.

Figure 1
Class of Mishap

	A	B	C	HAP	C/HAP
H-1	1	0	15	11	2
H-3	0	0	21	23	0
H-53	2	1	18	6	2
H-60	0	0	5	1	1
Total	3	1	59	41	5

TH-1F Class A

There have now been 45 H-1 class A mishaps since the Air Force started flying them. The last one lost was the N-model that crashed in the Bahamas in January 1984. The mishap in 1986 occurred during a missile convoy mission, with two pilots and four security police on board. While flying over rolling terrain, the helicopter suddenly pitched up, reversed course, dove towards the ground, and impacted the side of a hill. The only survivor was not able to provide any useful information, and no material defects or system failures were identified. This produced a class A mishap rate of 2.09 for 1986. The lifetime class A rate for the H-1 is 2.28.

HH-53H Class A

This mishap brings the total number of H-53 Class A mishaps to 22. The Air Force lost its last H-53 in 1985 during an attempt to rescue a crewman off a boat.

The most recent mishap occurred during a site survey in the mountains at high altitude. While on final, the aircraft impacted the ground short of the intended landing site. Mountain flying experience and procedural knowledge were factors in this mishap. Fortunately, all those aboard got out OK. The mishap rate for the year ended up at 15.5, while the lifetime Class A rate for the H-53 is 8.02. These high numbers are misleading since the H-53 force has flown an average of only about 11,000 hours a year, and even one mishap drives them up considerably.

CH-53C Class B

After touching down straight ahead on a slight upslope, the main rotor blades contacted the top of the forward fuselage. The rotor brake was applied, and after shedding a considerable amount of debris, the blades were stopped. The engines were shut down and the crew egressed without injury. There were a number of factors involved in this mishap, including training and supervision.

HAPS and Class C Mishaps

In 1986, the helicopter force experienced 59 Class C mishaps. This is a 13-percent increase over 1985's

52 Class Cs. There were also 41 HAPs submitted in 1986, the same as in 1985. Five mishaps were reported as combined Class C/HAPs. Figure 2 breaks these mishaps down farther.

Figure 2
HAP and Class C Mishaps

	H-1	H-3	H-53	H-60
Rotor System	5	0	1	1
Flt Controls	2	5	0	0
Engines	10	17	7	3
Drive System	2	4	1	0
Fuel System	0	1	1	0
Aircrew	4	6	2	2
FOD	3	1	3	1
Dropped Objects	0	3	3	0
Misc	2	7	8	0
Total	28	44	26	7

H-1

The Huey force suffered a Class A mishap in May that overshadowed an otherwise pretty good year. For the first time in several years, the H-1s did not have the largest number of reportable mishaps.

As usual, however, engines topped the list of mishaps. Five engine flameouts were experienced, with three of these happening in flight. During three successive functional check flights, an engine flamed out on an N-model. Only after changing out the fuel-oil heat exchanger did the problem go away.

An F-model lost its engine, and the crew did a good job getting it on the ground. The cause of the failure has not yet been determined. The other flameouts happened on the ground, with one being undetermined and the other being caused by a loose wire in a cannon plug. Four engines had to be shut down on the ground for oil supply problems, chip lights, and worn engine mounts.

All four aircrew mishaps were physiological episodes. Two involved ear blocks, one was a kidney stone, and the fourth crewmember was just plain sick.

The two miscellaneous episodes were unusual and both involved parachutists. The first was a jumper that got hung up while trying to jump from an N-model. He was cut free and landed uninjured.

The second was an inadvertent deployment of a jumper while he was sitting in a seat waiting to jump. His ripcord snagged on the aircraft and his chute deployed, jerking him out of the aircraft. His chute remained inflated, and he landed uninjured. If there was an award for having good luck, he would win it hands down.

Several safety programs are underway to improve the H-1 force. Because of a Class A mishap that occurred in 1984, the Air Logistics Command (ALC) has asked Bell Helicopter to make several improvements to the fuel system. These improvements include better fuel quantity indications, better fuel low level warning systems for each fuel cell, and a redesign to prevent trapped fuel.

Also, a safer and more reliable rescue hoist for the H-models is being built and should be installed in the near future.

H-3

The number of HAPs almost tripled in the H-3 force with 23 reported in 1986. There were many different types of incidents that occurred throughout the year, but the one repeated most often was flight control malfunctions because of greased tail rotor heads. This has been a recurring problem for years but, hopefully, we've seen the last of it.

The ALC has recently changed

continued

procedures and now a leaking tail rotor head cannot be converted to grease. This won't stop the leak, but it will prevent a tail rotor head from binding because of grease conversion problems.

Engine malfunctions accounted for 17 of the 21 Class C mishaps, and of these 17, a total of 10 were actual engine flameouts. Fortunately, only three of these happened in flight. Two were caused by worn or stripped components in the accessory drive, and the cause of the third was not determined.

Causes for the ground flameouts include a contaminated fuel filter, a broken throttle fuel control cable, crimped or leaking fuel lines, and the ever popular "undetermined."

The H-3 community enjoyed a good year in 1986. No aircraft lost and no serious injuries is a record many other weapon systems would be happy to have accomplished last year. This brings the lifetime Class A mishap rate for the H-3 to 4.30.

H-53

The H-53 force reported 26 HAP and Class C mishaps in 1986, up from 22 the year before. Several compressor stalls, an engine that quit during shutdown, and an engine that wouldn't quit during shutdown were some of the engine malfunctions that occurred last year.

Two more cracks were discovered in the tail pylon; however, neither were related to the problems that have been experienced in the past with the hinge fitting.

Testing on the crashworthy 650-gallon fuel tanks is almost complete, and they should start showing up in the field this year. Also being tested at this time is the new titanium main rotor blade and BIM system. Initial reports on the blade indicate that in addition to being crackproof, its more efficient design has resulted in a noticeable improvement in performance over the old blade.

H-60

The H-60 had its usual good year in 1986, with only seven Class C mishaps and HAPs being reported. However, several of these incidents could have easily been much more serious.

During a night formation flight using NVGs, No. 2 clipped a power wire with his gear. Luckily, the wire broke before the gear did, and it caused only minor damage to the helicopter.

In another incident, a nut was only hand-tightened on a pitch rod bolt. After the next flight, the nut was found laying next to the helicopter, and the pitch rod bolt had worked itself one-third of the way out. It's not hard to imagine what would have happened had that bolt worked itself out during flight.

Rounding out the more sporting incidents, during an autorotation, one of the engines flamed out. The engine flamed out again during a night, 360-degree operational approach using NVGs a few days later. Cause of the flameouts has not yet been determined.

It looks as if the H-60 will be making a seat change sometime this year. The Air Force received the aircraft with a pilot's seat that was not what we wanted. The process of getting a better seat has been long, but a new one is on the way.

Summary

Helicopters did not experience the best of years in 1986, but it could have been worse. Mishaps are certainly preventable with a lot of hard work on the part of operators, maintainers, and supervisors. A little good luck now and then helps, too.

A better 1987 is going to take an even greater effort by all of us. As soon as we are satisfied with our efforts and relax, that's when we are most vulnerable to the unexpected mishap. Let's not let that happen to us. Keep 'em flying. ■

1986 USAF EJECTION SUMMARY

RUDOLPH C. DELGADO
Directorate of Aerospace Safety

■ The 1986 USAF ejection experience shows 51 survivors out of 58 ejection attempts for an 88 percent ejection survival rate. This was a 7-point improvement over 1985's 81 percent, and it represents one of the most successful years since 1982's 89 percent.

An 88-percent ejection survival rate in this era of emphasis on the realistic training environment, with its attendant low-level flying, is quite an accomplishment. It reflects good life support training and good aircrew situational awareness.

This is borne out by a look at the ejections at 500 feet and below. Whereas these usually show a survival rate of less than 50 percent, 8 of the 12 we had in this category in 1986 were survived for a 67-percent rate.

The down side of the 1986 ejection experience is that no matter how good the survival rate, unless it is 100 percent, there are still some fatalities to contend with. We had seven in 1986. Four of these, as usual, were out-of-envelope, and three were due to other causes.

Out-of-Envelope Fatalities

■ An F-4 was participating in a flyby as part of an airshow. After takeoff, the aircraft proceeded to a designated holding point and held for approximately 25 minutes to await participation in the show. When cleared, the crew executed a high speed, low altitude pass along the centerline of the runway followed by a low speed pass. At the departure end of the runway, the pilot turned left, retracted the gear and flaps, and then turned right with intentions to execute another high speed flyby down the runway.

The aircraft started to descend as it approached a rollout heading for the runway, and impacted the sea 2 nm short of the runway. The aircraft was destroyed on impact, and both aircrew members ejected but received fatal injuries.

■ Another F-4 was lead of a two-ship dissimilar ACM mission. The crew chief, EOR inspector, and the pilot failed to note the right wing fold warning pin in the unsafe position. During the takeoff roll, the right wing folded resulting in loss of control. A dual sequence ejection was initiated from the rear cockpit. The WSO ejected with minor injuries, but the pilot was fatally injured by ground collision prior to man-seat separation. The aircraft was destroyed.

While most of the out-of-envelope ejections are fatal because they are initiated too close to the ground to allow the system time to function, one of the out-of-envelope ejections in 1986 was initiated beyond the high-speed end of the parameters.

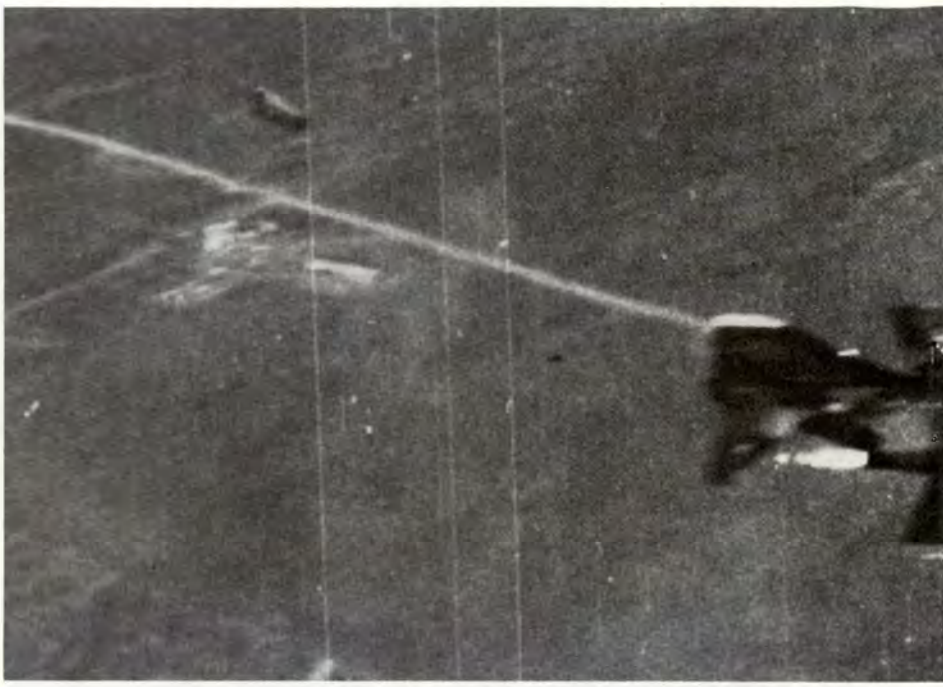
■ After completing an F-16 functional check flight (FCF), the pilot informed base he would be ready to return in 3 minutes for an ILS approach. This was the last radio transmission from the pilot. Radar contact was lost. The base requested an AC-130 aircraft proceed to the last known position and begin search operations.

The C-130 crew reported a radar return in the general vicinity of the mishap aircraft's last known posi-

continued

1986 USAF EJECTION SUMMARY

continued



tion and then sighted a parachute and life raft in the water. No floating wreckage was observed. Rescue arrived on the scene and recovered the fatally injured pilot.

The pilot initiated ejection at 6,000 feet MSL and in excess of 600 knots. Even though, technically, this is beyond the ACES II seat's 600-knot capability, this pilot sustained survivable limb fractures. Unfortunately, he was over water and, due to his injuries, could not inflate his survival vest and disconnect his parachute, so he drowned.

This is a classic example of the type of fatality we hope to save when the automatically inflated survival vest (LPU-9/P), the sea-water activated parachute canopy release (SEAWARS), and the automatic oxygen mask divestment systems become available.

In-Envelope Fatalities

Of the three in-envelope fatalities, one was an F-4 back-seater whose canopy did not jettison due to a fire-damaged canopy jettison pneumatic system. For unknown reasons, he did not use the alternate procedure to jettison the canopy. On the F-4, the seat will not eject unless the canopy is off.

■ The F-4 mission was a single-ship flight test techniques sortie with the profile including a tower flyby and a high altitude supersonic run, followed by practice VFR overhead patterns. The crew encountered some delay for a suspected fuel leak from the No. 5 fuel cell cavity which maintenance subsequently cleared.

The crew took off, completed the tower flyby, and climbed to enter the supersonic corridor and accomplish the supersonic run. Passing FL 300, the master caution light and the boundary layer control malfunction telelights illuminated. The pilot declared an emergency and began a return to base (RTB).

During RTB, the aircraft caught fire. The ejection sequence was initiated, and the pilot was ejected. The aircraft crashed with the WSO still in the aircraft. The WSO was fatally injured, the pilot sustained minor injuries, and the aircraft was destroyed on impact.

Another fatality occurred in a T-38 mishap. The aircraft actually struck the ground after an aborted touch-and-go attempt and was back in the envelope when the instructor pilot (IP) ejected.

■ The T-38 was on a dual contact sortie. During the flare of a no-flap touch and go, the left wingtip contacted the runway, and the aircraft departed the left side. The aircraft briefly became airborne and then impacted the ground. The IP was fatally injured when the ejection sequence was interrupted by drogue chute/seat entanglement with the wing. The SP suffered minor injuries when the uncommanded ejection sequence was initiated and interrupted by impact forces.

The last in-envelope fatality was an F-4 pilot who had seat-man-parachute interference.

■ The F-4 was No. 3 of a 4-ship Maverick upgrade flight. The aircraft took off and proceeded to the low level entry point. Approaching a low level turn point at 485 knots and 500 feet AGL, at least one bird struck the F-4 in the right forward fuselage area. Approximately 34 seconds later, the aircraft caught fire.

Both aircrew members ejected and successfully exited the aircraft. The WSO was minimally injured. The pilot was fatally injured when his loosely adjusted survival kit and a nonstandard knee board entangled with the seat. The seat then swung around, struck, and killed him and also severed the majority of his parachute shroud lines. The aircraft impacted the ground and was destroyed.

Summary

The ejection fatality causes are shown in Figure 1.

Figure 2 shows the 1986 ejection experience by aircraft and injury classification. The 18 major injuries (31-percent rate) do represent a concern, because this rate usually runs below 25 percent. Even more disturbing is the fact four occurred in ACES II seat-equipped aircraft. ACES II normally has a very low major injury rate.

One of these injuries was attributed to ejection acceleration or the landing phase. But, the nature of the injury, compression fracture of the L-1 vertebra, and the circumstances, a 15-to-25 foot fall from a tree, makes us believe it most likely occurred in the landing phase. The remaining major injury causes are shown in Figure 3.

Figure 4 shows the overall results of ejection-seat equipped aircraft mishaps for the year. As usual, it shows those who do not eject have a very small chance of surviving.

Even in a good ejection year such as this one, the message continues to call for enhanced situational awareness to try to save those that eject out-of-envelope and those that don't eject at all. ■

Figure 1
Ejection Fatality Causes

Cause	Number
Out-of-Envelope	4
System Failure	1
Struck by Aircraft	1
Seat/Man/Parachute Interference	1
TOTAL	7

Figure 2
Ejection Results By Aircraft

	Injury Classification					
Aircraft	Fatal	Major	Minor	Minimal	None	Total
A-10		2				2
F-4	5	8	7	6	2	28
F-5		1	1	2	1	5
F-15		2	1	1		4
F-16	1		2	4	2	9
F-106		1	1	1		3
T-33		1				1
T-37		1				1
T-38	1	2		2		5
TOTAL	7	18	12	16	5	58

Figure 3
Major Injury Causes

Cause	Number
Ejection Acceleration	*9
Landing Phase	*7
Windblast	3
Struck Cockpit	1
TOTAL	20

* Two individuals had both causes listed.

Figure 4
Escape System-Equipped Aircraft
Mishap Results

	Crewmen	
	Number	Percent
Ejected/Survived	51	63.8
Ejected/Fatal	7	8.7
Not Ejected/Survived	3	3.7
Not Ejected/Fatal	19	23.8
TOTAL	80	100

SAC's Success In '86

PEGGY E. HODGE
Assistant Editor

In this issue, we recap our "heavies" record for 1986 — once again, we report a great year for safety! We will highlight a part of this story. The Strategic Air Command (SAC) and one of its units — the 92d Bombardment Wing — experienced a particularly good year. "SAC's Success in '86" recaps their story and recognizes the achievements of these very fine and talented people. — Ed

SAC in '86

As the Air Force's long-range strike force of combat aircraft and intercontinental ballistic missiles, SAC is the greatest single deterrent to the threat of nuclear attack against the United States. The command's bombers and land-based intercontinental ballistic missiles are joined with US Navy sea-launched ballistic missiles to form the Nation's strategic triad.

It was a very good year in '86 as SAC celebrated its 40th anniversary.

- The Air Force awarded SAC the Secretary of the Air Force Safety Award, and as we reported last month, "the Strategic Air Command equaled the fewest number of Class A aircraft mishaps in its history during 1986 and, for the first time, completed two consecutive years without a Class B aircraft mishap."
- In this issue, we reported the tremendous feat accomplished by SAC's B-52 crews — 2 consecutive years without a Class A or Class B mishap. Never before had this feat been accomplished.
- The KC-10's safety record continues to tell SAC's success story. Since its first flight in 1981, there have been no Class A mishaps and only one Class B. And again in 1986, we reported no Class A or B mishaps.
- And to continue — In 1986, the C/KC-135 fleet passed a major milestone with 30 years of distinguished service to the Air Force with just one Class A, and for the second year in a row, there were no Class B mishaps.

The 92 BMW's Success Story

In 1986, the 92d Bombardment Wing (BMW) set an unprecedented, historical record — one which will most likely *never happen again*. This record is the 92d's magnificent winning at the 1986 SAC Bombing and Navigation Competition. The Fairchild crews "ran away" with the competition taking home 9 out of 11 trophies. The biggest prize was the coveted Fairchild Trophy. "It's never been done. It was just unprecedented and unbelievable. Everybody was a team, they had the right attitude, they practiced, and it worked," said Col Michael D. Edwards, the Wing's Deputy Commander for Operations.

"Bomb Comp" Significance For nearly 40 years, SAC's best crews have gathered to participate in this

competition. The competition — known affectionately as "Bomb Comp" — has helped build morale and sharpen the competitive edge of SAC's bomber and tanker crews and recently TAC's F-111s. Bomb Comp has served to test crew skills and equipment under exacting conditions. It has produced information which has led to improvements in techniques and tactics.

"Bomb Comp heightens 'esprit de corps.' We learn ways to do things smarter, and we learn new operational procedures. Bomb Comp crews bring new ideas back to the Wing — ideas on how each crewmember can do the job better and how they can all work together best. As a function of Bomb Comp, every skill is enhanced. We push ourselves to find the best way to do business, and so we learn a little more about it," said Lt Col Brian W. Horst, Operations Officer for the 92d Air Refueling Squadron.

These improvements, in turn, have strengthened SAC's ability to perform its wartime mission. The results of Bomb Comp have served as a barometer of SAC's capabilities as it progressed from the World War II vintage B-29 to the sleek, supersonic B-1B of the 1980s.

Ingredients for Success Bomb Comp crews and wing staff members reported team work and a personal commitment by everyone as primary ingredients for their success.

"The Wing didn't get that pinpoint bombing without the hard, dedicated efforts of *each and every one of you*. A quarterback may get the biggest salary, but you don't win football games without a quality line, without quality coaches, without quality equipment," said Col James W. Meier, 92 BMW Commander during the 1986 Bomb Comp.

Also, as Lt Col Kenneth S. Boyken, Project Officer for Bomb Comp and Assistant Deputy Commander for Operations, pointed out, "Unless you're willing to build a team, you won't succeed — and so we always stress the team concept."

And as Col Edwards further explained, "Bomb Comp crews had to work in very close coordination

with maintenance. They had to get the airplane 'fine-tuned' to fly. It's important that this kind of 'team work' reach all levels. A good relationship has to exist at all levels. If it doesn't work at the command level, it won't work on down the line."

Safety's Role Safety was *not* neglected during this highly intense competition.

"We can't do our job if we don't do it safely. If we lose assets, we're in trouble. The loss of crewmembers and aircraft really affects what we're doing," said Col Edwards. "Safety is inherent in all of us, the Wing Commander, myself as the DO, and in every crewmember and maintenance crew on the flightline," he explained.

"We have a saying," said Lt Col Boykin, "There isn't a training mission that's worth the cost of an aircrew or an airplane. They're both irreplaceable."

It was this type of team work, personal commitment by everyone, command support and leadership, and a good attitude toward safety that helped the 92d set their outstanding record.

We congratulate SAC and the 92d for their "Success in '86." ■

The two bomber crews flew the same aircraft — Tail #10007 — throughout Bomb Comp. They never had to go to the spare — the airplane just never broke.

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

Mishap Prevention

Program.

CAPTAIN

James A. Trinka

58th Tactical Training Wing
Luke Air Force Base, Arizona

■ On 17 April 1986, Captain Trinka was the instructor pilot for a three-ship F-16 student training sortie scheduled for an air combat maneuvering mission. Shortly after gear retraction on the formation takeoff he was leading, Captain Trinka's aircraft was struck in the engine intake by a large bird. This started a sequence which led to total loss of engine power. Captain Trinka quickly cleared his wingman and performed the appropriate zoom maneuver to gain more altitude. With this situation of a clean aircraft and an engine which was continuing to provide some usable thrust, Captain Trinka accurately determined he could return to land opposite the direction of traffic.

While skillfully maneuvering his aircraft with a flamed out engine, Captain Trinka had the presence of mind to switch his radio to Guard frequency, inform the the tower of his intentions, and request raising of the departure end cable for his opposite direction landing. Minimizing altitude loss through optimum angle-of-attack control and smooth flight control inputs, Captain Trinka aligned the aircraft with the runway. When he was positive he could make the runway, he lowered the landing gear with the emergency system. He then made a smooth touchdown, quickly determined normal braking action was not available, and steered the aircraft for a successful cable engagement.

Captain Trinka's skillful application of appropriate emergency procedures and his expert airmanship saved a valuable aircraft and perhaps saved his life and the lives of others that may have been in the path of the powerless F-16. WELL DONE! ■

☆U.S. GOVERNMENT PRINTING OFFICE: 1987 — 779-045/40009

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 Mishap Prevention Program.

MAJOR

Ricardo M. Cazessus

8th Tactical Fighter Wing

■ On 22 April 1986, Major Cazessus was flying the lead aircraft, an F-16, during a comm-out recovery of a 43-aircraft large force employment exercise. On final approach, Major Cazessus was unable to slow his aircraft below 200 KCAS. As he executed a go-around, the engine auto-accelerated to military power and would not respond to throttle movements. Major Cazessus realized the aircraft recovering behind him had little extra fuel and needed to land.

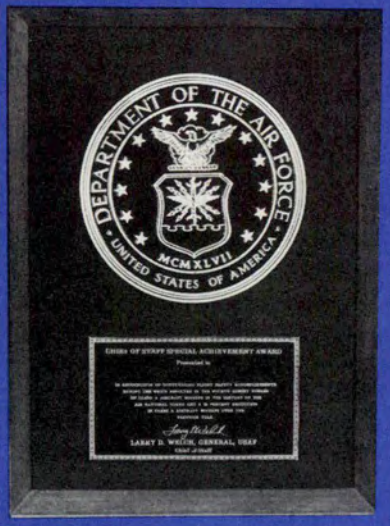
He quickly started a climb and attempted to prevent a further airspeed increase by making a high-G turn. He immediately informed tower of his problem and turned away from the runway to set up for a straight-in flameout approach. The engine continued to operate at a high thrust level, resulting in excess airspeed and continued depletion of his now dangerously low fuel supply. Major Cazessus turned his aircraft back toward the runway and began the approach.

On short final, when he placed the throttle to cutoff, the engine continued to run, so Major Cazessus adjusted his pattern and set up for an overhead flameout approach. Realizing he was running out of fuel, he made a climbing left turn to a low key position. During this turn, he shut down the engine with the fuel master switch and manually started the jet fuel starter and the emergency power unit. Major Cazessus guided his F-16 to a flameout landing.

He continued to assess the overall situation after touchdown, realizing if he stopped on the runway and closed it, over half of the wing's aircraft would be forced into an emergency fuel state and probably would be required to land on a parallel taxiway or the secondary runway. With 3,000 feet remaining on rollout, Major Cazessus guided his aircraft so as to coast to a stop in the dearm area near the runway's departure end. Having achieved this, he egressed uneventfully while the wing's aircraft continued their surge recovery without further incident.

Major Cazessus' quick, accurate reactions, tempered by extraordinary situational awareness, saved the Air Force a valuable aircraft. WELL DONE! ■

USAF SAFETY AWARDS



THE CHIEF OF STAFF
SPECIAL ACHIEVEMENT AWARD

MILITARY AIRLIFT COMMAND

For the second consecutive year, the Military Airlift Command equaled the second fewest number of Class A mishaps in the history of the command. The years 1985 and 1986 combined are the command's best 2 consecutive flight safety years ever. Additionally, the command did not experience a single Class B aircraft mishap for the first time in 11 years. This impressive record was achieved while flying more than 767,000 hours in support of a global airlift mission and attests to the professionalism and the total commitment to safety of the men and women of the command.

AIR NATIONAL GUARD

The Air National Guard achieved the fourth lowest Class A mishap rate in its history during 1986 and reduced the number of mishaps by 25 percent from the preceding year. The command also equaled the second lowest number of aircraft mishap fatalities in its history. More than 414,000 hours were flown in 17 different types of aircraft performing a variety of missions including strategic and tactical airlift, tactical air support, tactical reconnaissance, fighter interceptor, rescue, and air refueling. More than 65 percent of the total hours flown were in fighter/attack aircraft. These accomplishments attest to safe operational and maintenance effectiveness and a high degree of professionalism among all members of the command. ■