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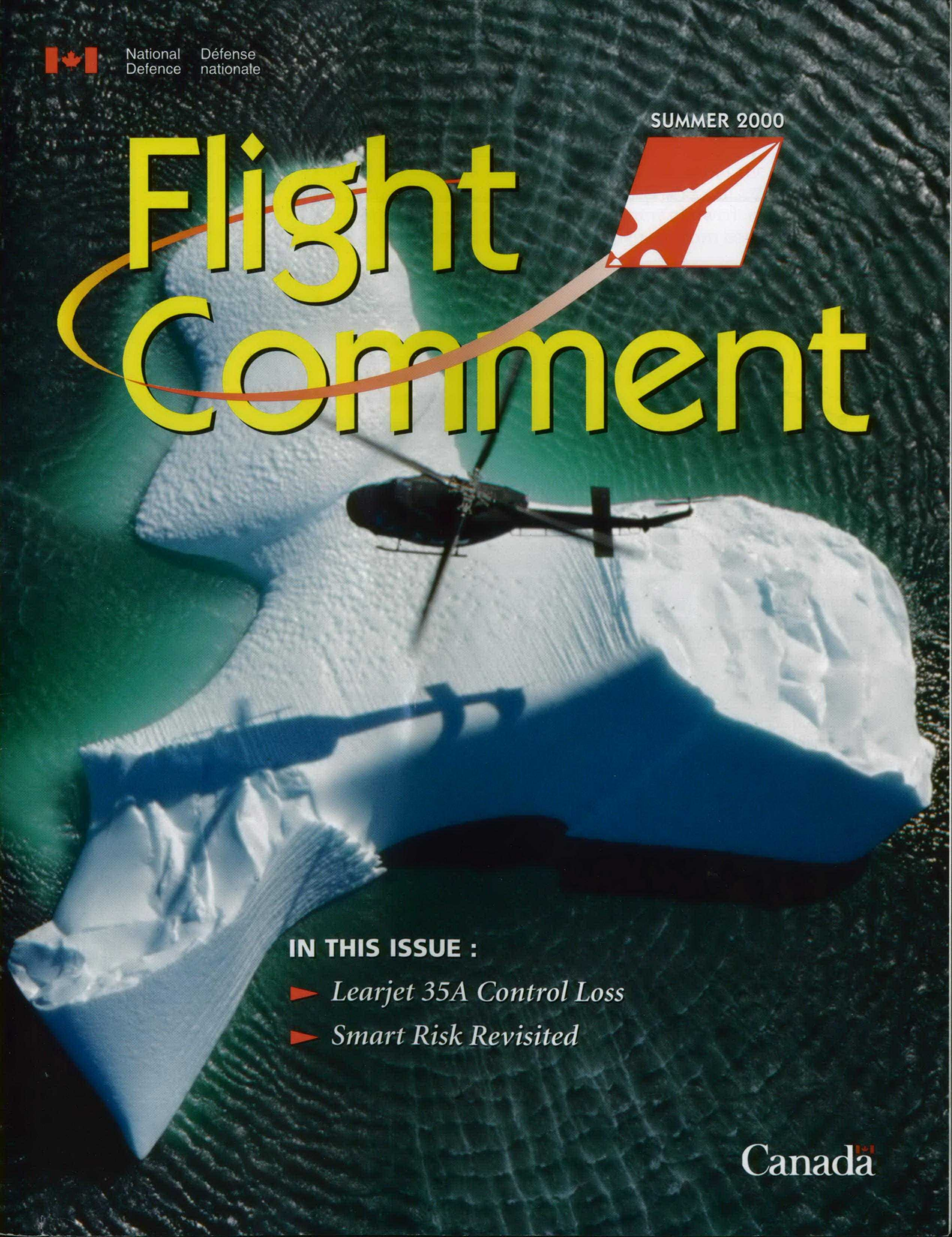
Flight Comment



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Canada

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Fuel Imbalance Cited in Learjet 35A Control Loss

The U.S. Air Force said that the flight crew of a C-21A (military version of the Learjet 35A) did not have a checklist to help them correct a fuel imbalance that was caused by a fuel-pump malfunction. During approach for an emergency landing, the crew allowed airspeed to become too slow and made control inputs that caused the aircraft to depart from controlled flight.

FSF Editorial Staff

On April 17, 1995 , the flight crew of a U.S. Air Force C-21A (the Air Force designation for the Gates Learjet 35A) declared an emergency because of a fuel problem and diverted the flight to Thomas C. Russell Field in Alexander City, Alabama, U.S. The crew was maneuvering the aircraft for a visual approach to the airport when the aircraft struck terrain. The two flight crewmembers and six passengers were killed.

The Air Force said, in its final report, that the accident was caused by a combination of an aircraft mechanical malfunction, a flight-manual deficiency and human error.

"The investigating officer found that the mechanical malfunction consisted of the right standby [fuel] pump continuing to operate uncommanded after engine start," the report said. "This malfunction resulted in fuel being pumped into the left wing and prevented fuel from being transferred to the right wing during normal transfer procedures. This condition caused a fuel imbalance."

The report said that the Air Force C-21A pilot-training syllabus and the Air Force C-21A flight manual did not contain an available checklist for correcting a fuel imbalance that occurs during the transfer of fuel from the fuselage tank to the wing tanks. The checklist, "fuel imbalance during fuel transfer," was published by the aircraft manufacturer in 1990.

"The Air Force, for whatever reason, did not contract for flight-manual updates from [the air, manufacturer] following our purchase of the airplane in 1984," the report said. "This emergency procedure was included in civilian Learjet flight-manual updates published by [the manufacturer] subsequent to 1984. As a result, the Air Force training syllabus likewise did not include this emergency procedure."

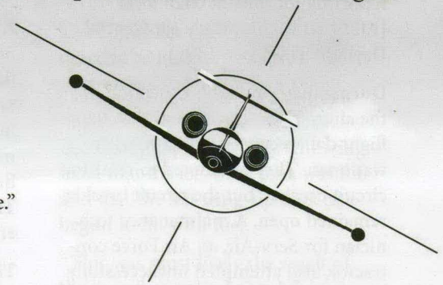
The report said that the flight crew believed incorrectly that fuel in the left wing had become "trapped" and that both engines were using fuel from the right wing.

"Because the crew did not have checklist or flight-manual guidance on this problem, the crew misanalyzed the malfunction." the report said. "They failed to correct the fuel imbalance as a result, allowed their airspeed to become too slow for the aircraft's configuration when attempting to land and then made control inputs that caused the aircraft to enter a flight regime from which they could not recover."

The aircraft was operated by the 332nd Airlift Flight at Randolph Air Force Base (AFB), Texas. On the day of the accident, the aircraft was scheduled to be flown from Randolph AFB to Wright-Patterson AFB, Ohio, and then to Andrews, AFB, Maryland, before being flown back to Randolph AFB. The scheduled flight crew duty period was 15 hours and 30 minutes.

The designated aircraft commander was an Air Force first lieutenant. He had 1,074 flight hours. He had 877 flight hours in the C-21A, including 672 flight hours as copilot and 205 flight hours as pilot.

"Flight records indicate [that he] was qualified and authorized to fly the mission as the aircraft commander." said the report.



The aircraft commander completed Air Force pilot training in March 1993, was upgraded to C-21A copilot in June 1993 and was upgraded to C-21A first pilot in March 1994.

"His final upgrade to aircraft commander was completed Aug, 31. 1994," the report said. "He was current, and no training deficiencies were noted."

The designated copilot was an Air Force captain. He had 2,242 flight hours, including 933 flight hours in the Northrop T-38 and 588 flight hours in the Lockheed C- 130. He had 527 flight hours in the C-21A, including 167 flight hours as copilot, 342 flight hours as pilot and 18 flight hours as instructor.

"Flight records indicate that [he] was qualified as [a C-21A] instructor pilot and authorized as the copilot for this mission," said the report.

The copilot completed Air Force pilot training in December 1988 and served as a T-38 instructor until November 1991, when he began flying the C-130. He completed initial C-21A training in February 1994 and was upgraded to C-21A aircraft commander in May 1994.

"His final upgrade to C-21A instructor pilot was conducted locally with the 332nd Airlift Flight and [was] completed on Dec. 19, 1994," the report said. "He was current and no training deficiencies were noted."

The report said that the pilots "received adequate crew rest" before reporting for duty at 0420 local. [All times in this article are Central Daylight Time.]

During their preflight inspection of the aircraft, the crew found that the flight data recorder circuit breaker was open. They attempted to reset the circuit breaker, but the circuit breaker remained open. A maintenance technician for Serv-Air, an Air Force contractor, also attempted unsuccessfully to reset the circuit breaker.

"A new flight data recorder was installed by the technician, but this did not correct the problem," the report said. "Serv-Air personnel offered the crew a different aircraft, but the aircraft commander declined."

The report said that Air Force regulations require an aircraft's flight data recorder to be operational when the aircraft departs from its home base: the accident aircraft's flight data recorder was not operational when the aircraft departed from Randolph AFB.

The crew and six passengers were aboard when the aircraft, call sign Kiowa 71, took off from Randolph AFB at 0623. The aircraft was landed at Wright-Patterson AFB at 0844. Four passengers remained at Wright-Patterson AFB, and five additional passengers boarded the aircraft for the flight to Andrews AFB.

"There are no indications that the preflight activities were other than normal at Wright-Patterson AFB," the report said, "Fuel was not purchased, and the takeoff was on time [at 0958]."

The aircraft was landed at Andrews AFB at 1057. All of the passengers deplaned. The crew requested a full load of fuel and told Serv-Air maintenance technicians that they had been unable to transfer fuel from the wing tanks to the fuselage tank. [See Appendix, for details about the C-21A fuel system.]

A Serv-Air maintenance technician removed the fuel-control panel from the aircraft and replaced the fuselage-tank transfer/fill switch. While working on the fuel-control panel, the maintenance technician reset the flight data recorder circuit breaker. The report said that the circuit breaker remained closed.

The maintenance technician told the crew that replacement of the fuselage-tank switch had not corrected the problem and that he was going to try to correct the problem by replacing the fuel-control relay panel.

One crewmember asked how much time was required to replace the panel. The maintenance technician said that it was a time-consuming job because the fuel-control relay panel is in the tail of the aircraft.

"[The crewmember] said that if it would take too long, not to worry about it [i.e., replace the fuel-control panel] since the fuselage … tank was full and [since] they had not had trouble earlier in the day getting fuel out of the fuselage tank," the maintenance technician said. - "[The crewmember said] that they would be able to take the aircraft the way it was."

The aircraft departed from Andrews AFB at 1638 — 38 minutes after the scheduled departure time, because some passengers had been late in arriving. The flight crew's instrument flight plan listed three hours and 45 minutes as the expected flight time to Randolph AFB. The aircraft commander was the pilot flying.

The aircraft was in cruise flight at Flight Level (FL) 390 at 1753 when the crew began to transfer fuel from the fuselage tank to the wing tanks. The crew did not know that the right standby fuel pump was operating and was preventing fuel from being transferred from the fuselage tank to the right wing. The report said that both standby fuel pump switches were in the "off" position. (If a standby fuel pump switch is in the "on" position, the standby pump automatically is deactivated under normal conditions when the fuselage-tank switch is selected to "transfer.")

Post-accident examination showed that bearings in the right standby pump were in a deteriorated condition and that the pump had required higher-than-normal electrical current for rotation. The higher-than-normal electrical current had caused progressive damage to two contacts in the fuel-control relay panel and eventually had caused the contacts to bond together.

"This caused the pump to run continuously throughout the flight and [to] prevent fuel transfer from the fuselage tank to the right wing," the report said. "In fact, fuel would also transfer from the right wing to the left [wing] when the crossflow valve between the wings opened automatically during the transfer procedure."

Post-accident simulations of the standby-fuel-pump malfunction showed that a fuel imbalance would increase at a rate of 150 pounds (68 kilograms) per minute when fuel was transferred from the fuselage tank.

"According to cockpit voice recorder discussions, the aircrew noticed that the left wing-tip [tank] had become 800 pounds [363 kilograms] heavier than the right [wing-tip tank] during the transfer, and they attempted to analyze the malfunction and correct the imbalance," the report said. "A fuel-imbalance-during-fuel-transfer malfunction [however] is not included in the Air Force training syllabus, nor is the procedure contained in the C-21A checklist."

The report said that in January 1993, another C-21A flight crew observed a fuel imbalance while transferring fuel from the fuselage tank and had corrected the problem by opening the circuit breaker for the standby fuel pump in the wing that contained less fuel than the other wing.

"When questioned as to why he suspected the standby pump [was] running, [the aircraft commander] indicated he had been informally introduced to this malfunction while attending simulator training at SimuFlite," the report said. "The procedure is covered in civilian Learjet training, and a procedure entitled 'fuel imbalance during fuel transfer' is part of the civilian checklist."

The "fuel imbalance during fuel transfer" checklist recommends that, if normal procedures for correcting a fuel imbalance are not effective, the crew should open the circuit breaker for the standby fuel pump in the "light wing" (i.e., the wing containing less fuel than the other wing).

The checklist said, "This problem is a system failure allowing the standby pump to run whenever the circuit breaker is in."

The report said that when the accident crew used normal procedures for balancing the wing tanks, the fuel imbalance became worse.

"The pressure generated by the operating right standby pump would not have allowed fuel to come into the right wing [the light wing] when following these procedures," said the report.

At 1756, the copilot cold the Atlanta Air Route Traffic Control Center (Atlanta Center) controller. "Sir, we need to revise our flight plan. We're having a problem getting some fuel out of one of our wings. Can we get vectors to Maxwell Air Force Base? And we're going to need to dump fuel for about five minutes."

The copilot told the controller that the estimated time en route to Maxwell AFB (which is in Alabama) was about 28 minutes and that fuel remaining in the aircraft after they dumped fuel would be sufficient for about two hours of flying.

"We're not going to dump a whole lot," the copilot said. "We just need to even the wings. We got a pretty good imbalance going."

The copilot used the cabin speaker to tell the passengers about the fuel problem and the diversion.

"We're having a fuel problem," he said. "We can't get it out from one of our wings. The plan right now is to go to Maxwell Air Force Base, have the problem worked on …get some gas and continue on to Randolph. The problem is we can't get fuel out of one of our wings. We just want to look and make sure. We're not sure. Sorry."

The crew at 1800 began to dump fuel from the left wing-tip tank. The report said that the crew dumped all of the fuel from the left wing-tip tank.

The aircraft commander told the copilot that he was reducing the amount of aileron trim that he had been using to keep the wings level.

"Look how much trim I have in," he said. "I'm starting to take it out."

The copilot said. "Except it looks like we're starting to get an imbalance between the wings [the wing tanks] themselves now."

When the aircraft commander asked how much of an imbalance existed, the copilot said. "'Ah, 200 [pounds (91 kilograms)]."

The aircraft commander said, "That's no big deal."

The copilot said. "No … doing the same thing, though."

"Yeah, let's just get down," the aircraft commander said. "I don't like this."

At 1803, the copilot told Atlanta Center. "We've completed our fuel dumping and [would] like to start a descent into Maxwell if we can."

The controller told the crew to descend to FL 350.

The report said that the crew then observed that fuel quantity was decreasing rapidly in the right wing tank, that the left wing tank was full and that the left wing-tip tank had begun to fill with fuel.

"This was most likely the result of the crossflow valve being left open after previous attempts to balance the wings," said the report. [With the crossflow valve open, the operating right standby pump would have moved fuel from the right wing into the left wing.]

At 1807, the copilot told the Atlanta Center controller, "Sir, we'd like to declare an emergency at this time for a fuel problem and, ah, get to Maxwell quick as we can."

The controller told the crew to fly direct to Maxwell AFB and asked if they would prefer to go to another airport.

The copilot said, "We can still take Maxwell. I believe. We just need to get there quick as we can."

The report said that the crew became increasingly concerned about the rapid reduction of fuel in the right wing tank.

At 1808, the aircraft commander said, "Look at the right wing. man."

The copilot said. "Yeah, it's just sucking everything out of it, isn't it?"

"Let's consider another airport," the aircraft commander said. "We need to get on the ground."

The copilot requested a lower altitude. Atlanta Center told the crew to descend to 17,000 feet.

The report said that the crew believed that both engines were operating on fuel from the right wing tank and that fuel starvation and flameout of both engines was imminent.

"Absent other guidance, the crew incorrectly concluded that the right wing was providing fuel to run both of the engines and that the fuel on the left side was trapped," said the report.

[Depletion of fuel in the right wing tank would cause the right engine to flame out; the left engine would continue to operate on fuel from the left wing tanks.]

At 1811, the aircraft commander said. "I don't understand what's going on. … It's gonna have an early flameout, Paul." [Both pilots were named Paul.]

The copilot said. "I know."

At 1811, Atlanta Center told the crew to descend to 11,000 feet.

The copilot told the aircraft commander that they were 60 nautical miles (111 kilometres) from Maxwell AFB and recommended that they request clearance to land at a closer airport. The aircraft commander agreed.

At 1815, the copilot told Atlanta Center. "We need to change the airfield, to get to the closest piece of pavement we can land on. "

The controller said, "Kiowa 71, we got an airport at 12 o'clock and 12 miles. It's Alexander City. I'll get you a runway length here in just a second. Just stand by."

"OK, Kiowa 71, we need it ASAP [as soon as possible], sir." the copilot said, "We're not going to have engines shortly."

"OK, the runway length at Alexander City is a hard surface at 4,400 feet," said the controller.

The crew then discussed whether the controller had said the runway was 4,400 feet (1,342 metres) long or 2,400 feet (732 metres) long.

At 1816, the copilot asked the controller. "Sir, was that, ah, 2,400 feet?"

The controller said. "OK, the airport at 12 o'clock and, ah, seven miles is 4,400 feet. I have an airport off your right wing and 22 miles [that] is 5,400 feet."

"Sir, we'll take the one at 12 o'clock," the copilot said.

The controller told the crew that they were cleared for an emergency descent to the Alexander City airport.

The copilot said that they had the airport in sight. [Alexander City is approximately 38 nautical miles (70 kilometres) northeast of Maxwell AFB.]

The aircraft commander told the copilot that he did not have the airport in sight. The copilot attempted to point out the airport, but the aircraft commander said, "I don't see it." The aircraft commander then transferred control of the aircraft to the copilot.

"Take the plane," the aircraft commander said.

"I have the aircraft," the copilot said.

The copilot then told Atlanta Center. "Sir, please clear everybody out of our way. We're on, ah, I guess a left base to this runway. "

The controller cleared the crew to conduct a Visual approach to the airport and told them to change frequencies to Montgomery (Alabama) Approach Control.

"They acknowledged the radio-frequency change but never checked in with approach control," said the report.

The aircraft was northeast of the airport at 8,800 feet and was descending at 5,600 feet per minute with the wing-lift spoilers extended when the copilot told Atlanta Center that they were on a left base for the runway. [Airport elevation is 686 feet.]

"Eyewitness testimony, cockpit voice recorder [information] and flight data recorder information indicate that the crew attempted to fly visual traffic pattern to Runway 18 but were in a poor position to complete the approach and landing," the report said. "They subsequently elected to enter a left downwind leg for Runway 36."

The aircraft was at 3,200 feet at 1817 when the aircraft commander told the copilot to "level off." The crew retracted the spoilers.

The copilot said. "We got a heck of an imbalance here."

The report said that as airspeed was reduced, aileron authority diminished "and, because of the fuel imbalance, the aircraft became difficult to control."

"Simulator tests under these conditions required [the pilot flying to keep] both hands on the yoke for directional control," the report said. "Simulator turns to the left were rapid, and turns to the right were nearly impossible."

The copilot, flying from the right seat, did not have a good view of the runway and asked the aircraft commander for help in positioning the aircraft on downwind and in beginning the turn toward the runway.

"How's it look now?" the copilot said.

"Looks good, looks good," the aircraft commander said. "Gear down Flap 20."

"Don't put anything down," the copilot said. "Nothing down, nothing down." [Earlier in the flight, when the crew was discussing their plan to divert to Maxwell AFB, the copilot had recommended that they delay reconfiguring the aircraft for landing until they were on short final approach.]

"OK, don't turn," the aircraft commander said. "Don't turn … [because] you're gonna be close."

The aircraft was at 2,030 feet when the gear-warning horn sounded. The aircraft commander said, " Gear down. Gear down."

The copilot said, "No. Stand by. Stand by."

"Gear down," the commander said. "Gear down, man."

"No, not yet, not yet." the copilot said.

The copilot then asked the aircraft commander to "push the power up a little bit for me." The report said that the sound of the gear-warning horn stopped, indicating that the aircraft commander had increased power.

The aircraft commander said. "Gear down, man."

The copilot said, "I can't, Paul."

The cockpit voice recorder then recorded the sound of gear doors opening and the landing gear extending.

The copilot told the aircraft commander to "push the power up."

The aircraft was at about 1,500 feet and was one mile (1.9 kilometres) southwest of the runway at 1819 when the copilot began a left turn.

"Approximately halfway through the final turn and one mile due south of Runway 36, the aircraft abruptly rolled out, flew through the extended [runway] centerline and continued in an east, northeasterly direction … approximately 800 feet above the ground," said the report.

The report said that the copilot had rolled out of the turn to regain lateral control of the aircraft. The aircraft was flown northeast for approximately 20 seconds.

The aircraft commander told the copilot several times to "step on the ball."

The report said, "Analysis of the engines and engine-sound tracings indicates that both engines were operating and that [the right engine] was operating at a reduced thrust setting … This might suggest that the crew may have advanced the thrust levers asymmetrically in an attempt to counteract the effects of the fuel imbalance."

The report said that the aircraft commander, to center the ball in the slip indicator, applied pressure on the left rudder, against pressure that was being applied on the right rudder by the copilot.

The aircraft commander said, "Step on the rudder. Step on the rudder."

The copilot said, "Paul, no. Paul, don't."

The report said that the application of left rudder caused the aircraft to roll left rapidly.

"The flight manual warns: 'Improper rudder input in conjunction with overly aggressive single-engine power application may cause loss of aircraft control. Recovery may not be possible.'", the report said. "Simulator tests under these conditions revealed that attempting to coordinate flight by centering the ball on the slip indicator would cause the aircraft to roll uncontrollably. Recovery at such a low altitude was not possible."

Witnesses said that the aircraft was flying just above the treetops when it rolled inverted, entered the trees and struck the ground three miles (5.6 kilometres) east of the airport.

The report said that the aircraft exploded upon impact and burned.

"Analysis reveals that the aircraft impacted heading northeasterly (049 degrees) in an inverted attitude, right wing down 20 degrees and 45 degrees nose down," the report said. "The wreckage pattern covered an area approximately 350 feet [107 metres] long and 100 feet [31 metres] wide along heavily wooded, downsloped terrain."

"Most of the aircraft was broken into small pieces, with the exception of the cockpit, right wing, tail section and engines. The cockpit came to rest very near the impact crater with the engines continuing another 115 feet [35 metres] and coming to rest in a small stream. "

[Editorial note: This article. except where specifically noted. was based on the U.S. Air Force Aircraft Accident Investigation Report. C-21A 84-0136. 17 April 1995, Alexander City, Alabama. The 703-page report contains diagrams and photographs.]

Reprinted courtesy of the Flight Safety Foundation *Accident Prevention* Vol. 57 No. 2 February 2000 ◆

Appendix
C-21A Fuel System Details

- The aircraft can carry approximately 2,390 pounds (1,084 kilograms) of fuel in the two wing-tip tanks, 2,508 pounds (1,138 kilograms) of fuel in the two internal wing tanks and 1,340 pounds (608 kilograms) of fuel in the fuselage tank;
- Fuel from each wing tank is supplied to the engine on the same side of the aircraft; the fuel system does not have engine-crossfeed capability (i.e., fuel from the right wing tanks cannot be provided directly to the left engine, and fuel from the left wing tanks cannot be provided directly to the right engine);
- Fuel from the wing-tip tanks is depleted first. Gravity causes approximately half of the fuel in the wing-tip tanks to flow into the wing tanks; jet pumps in the wing-tip tanks move fuel remaining in the wing-tip tanks to the wing tanks;
- The flight crew uses a two-position ("xfer" and "fill") switch either to transfer fuel from the fuselage tank into the wing tanks and wing-tip tanks, or to fill the fuselage tank with fuel from the wing tanks and wingtip tanks;
- The crossflow valve between the wing tanks opens automatically when fuel is transferred from the fuselage tank to the wing tanks and wing-tip tanks. The crossflow valve is opened manually during refueling and to balance the fuel loads in the wing tanks and wing-tip tanks;
- Standby electric fuel pumps in the wing tanks are activated automatically during engine start and during transfer of fuel from the wing tanks to the fuselage tank. The standby fuel pumps can be activated manually when an engine-driven fuel pump fails and to balance fuel in the wing tanks and wing-tip tanks; and,
- Fuel-dump valves in the wing-tip tanks can be activated manually to jettison fuel from the wing-tip tanks. ◆

U.S. Air Force C-21A

C-21A is the U.S. Air Force designation for the Gates Learjet 35A, a light twin-turbofan business aircraft that first flew in 1973. The Air Force in 1983 contracted with Gates Learjet for the lease and logistical support of 80 C-21As, which replaced North American/Rockwell CT-39 Sabreliner aircraft for personnel transport, cargo transport and medical-evacuation missions.

The aircraft has accommodations for two pilots and up to eight passengers. Each of the two Garrett (now AlliedSignal) TFE731-2-2B engines is rated at 3,500 pounds (15.6 kilonewtons) static thrust. Maximum usable fuel capacity is 931 gallons (3,524 liters). Fuel is stored in two wing-tip tanks, two internal wing tanks and one fuselage tank.

Maximum takeoff weight is 18,300 pounds (8,300 kilograms). Maximum landing weight is 15,300 pounds (6,940 kilograms). Landing distance at maximum landing weight is 3,075 feet (938 metres). Power-off stall speed in landing configuration is 96 knots (178 kilometres per hour).

Source: Jane's *All the World' Aircraft*

Cockpit Voice Recorder

Transcript,

U.S. Air Force C-21A, April 17, 1995

AC	=Aircraft commander
CO	= Copilot
?	= Speaker unknown
-I	= Intra-aircraft communication
-R	= Radio communication
( )	= Note inserted by accident investigators
CTR	= Atlanta (Georgia, U.S.) Air Route Traffic Control Center
MAX	= Maxwell Air Force Base dispatch
CVR	= Cockpit voice recorder
GPWS	= Ground-proximity warning system 1803:05 CTR Kiowa 71, go ahead.

(FSF editorial note: The following transcript is as it appears in the U.S. Air Force accident report. except for minor column rearrangement, interpolation of some times and addition of notes defining some terms that may be unfamiliar to the reader. Times are local. The transcript begins as the flight crew jettisons fuel from the left wing-tip tank; the aircraft is at Flight Level 390.)

Time	Source	Content
1801:02	AC-I	Look how much trim I have in. I'm starting to take it out.
1801:03	CO-I	OK.
1801:24	AC-I	How much is in the wing tip now?
1801:26	CO-I	Left tip is down to 300. The wings are still fine.
1801:28	CO-I	Except it looks like we're starting to get an imbalance between the, the wings themselves now.
1801:30	AC-I	Oh, how much?
1801:31	CO-I	Ah, 200 … 1200 in the right and, 13 left.
1801:33	AC-I	That's no big deal.
1801:35	CO-I	No … doing the same thing though.
1801:36	AC-I	Yeah, let's just get down. I don't like this. Heh, heh. (chuckles)
1801:40	AC-I	It's just …It feels …You should fly it, it feels squirrelly … you know?
1802:02	CO-I	Now it's just acting pretty normal.
1802:03	AC-1	Yeah …
1802:04	CO-I	200 pounds now.
1802:20	CO-I	I landed once with a 600-pound imbalance.

1802:22	AC-1	In this plane?
1802:23	CO-I	We messed up the transfer … 600 pounds. (chuckles) Yeah, we got another imbalance going, Look at this: 12, 13 fifty.
1802:26	AC-I	OK. We need…Can you, can you ask for a descent?
1802:34	CTR	CTR Kiowa 71, contact Atlanta 126.82, twenty-six eighty-two, and advise them when you have begun and when you have finished your, ah, fuel dumping, please.
1802:46	CO-R	Kiowa 71, roger.
1802:48	CO-I	It hasn't changed much from that. I'm gonna turn it off. It's been sitting there. ([The copilot] probably turns off the fuel jettison valves. Total dump time [approximately] 2.5 minutes.)
1802:50	CO-I	It dumped it all in the first couple of minutes, and it hasn't changed, so…
1802:52	AC-I	Yeah, that's cool.
1802:53	CO-I	But now you've got 150, almost 200 again.
1803:00	AC-I	That's no big deal, just weird.
1803:04	CO-R	Center, Kiowa 71.
1803:05	CTR	Kiowa 71, go ahead.
1803:07	CO-R	Yes, sir, we've completed our fuel dumping and, ah, just like to start a descent into Maxwell if we can.
1803:12	CTR	71, roger, descend and maintain FL 350.
1803:15	CO-R	Kiowa 71, out of 390 for 350.
1803:16	CO-I	OK, you got the radios, I'll make the inbound call.
1803:18	CTR	Delta 604, descend and maintain FL 350.
1803:20	CO-I	Is that us?
1803:22	AC-I	Yeah, down to 35.
1803:24	CO-R	Kiowa 71, down to 350, out of 39. ([The copilot] also answers Atlanta Center's call to Delta 604.)
1803:26	CTR	OK.
1803:32	CO-I	OK, you got victor one.
1803:34	CO-R	Maxwell, Maxwell dispatch, Kiowa 71.
1803:38	MAX	Placer 81, Maxwell dispatch, go ahead, over?
1803:40	CO-R	This is Kiowa 71, how copy?
1803:42	MAX	Placer 81, Maxwell dispatch. You're coming in very broken. Say again, over?
1803:45	CO-R	Maxwell dispatch, this is Kiowa 71, K I O W A, from Randolph. How copy?
1803:49	AC-I	Make sure you tell them about the codes.
1804:00	CO-I	We've not that far. (Radio music heard from Maxwell dispatch UHF radio. Probably a stuck mike.)
1804:02	CO-I	I don't believe this!
1804:05	CO-R	Maxwell dispatch. Kiowa 71 …
1804:10	CO-1	(sigh)
1804:15	CO-I	I don't have the Volume 12 out.
1804:17	AC-I	OK, I'll get it and hand it over to you.
1804:20	CO-1	Want me to fly for a second while you look?
1804:22	AC-I	OK, you have the aircraft?
1804:24	CO-I	Yeah, my aircraft.
1805:00	CO-R	Maxwell dispatch, Kiowa 71. (Maxwell dispatch answers, but is totally unreadable on UHF)
1805:30	CTR	Kiowa 71, contact Atlanta Center 128.72.
1805:34	AC-R	128.72, Kiowa 71.
1805:47	AC-R	Atlanta Center, Kiowa 71, we' re passing 36 for 350.
1805:54	CTR	Kiowa 71, roger, I'll have a lower altitude in about 10 miles.
1805:59	AC-R	Kiowa 71, roger.
1806:10	CO-1	You wanna fly again, I gotta try to figure…?
1806:12	AC-I	OK, I have the aircraft.
1806:15	CO-1	These guys aren't answering. It sounds like they're playing the radio now. Comm, comm … 122.85.
1806:20	CO-R	Maxwell dispatch, Kiowa 71 on victor.
1806:24	MAX	Kiowa 71, Maxwell dispatch, go ahead.
1806:26	CO-R	OK, we finally got a good read, thanks, uh, we're, we've got a, uh, maintenance problem and we are heading into Maxwell. Do you know if Ser-Air's still around?
1806:34	MAX	That's affirmative. What's your, ah, problem, over?

1806:40	CO-R	OK, I'll give you the whole scoop here. We're a C-21. We have six passengers on board, three space-As, one civilian code three, an Air Force code five, um, we have a problem with our fuel transfer. We're getting a pretty significant fuel imbalance. We've already dumped fuel once, so we need the, uh, fuel system looked at. And our ETA to Maxwell is about twenty minutes. And, uh, well I guess we're Alpha three.
1807:15	MAX	Kiowa 71, let me reconfirm. You're a C-21, you have 6 pax, 3 space-As, a civilian code 3, an Alpha 5, you have a fuel problem, be here in less than 20 minutes.
1807:22	CO-R	That's affirmative, Kiowa 71.
1807:36	CTR	Kiowa 71, descend and maintain FL 240. (Atlanta Center)
1807:37	MAX	Kiowa 71, what's your tail number, over? (Maxwell dispatch)
1807-39	AC-R	Down to 240, Kiowa 71.
1807:40	CO-R	Kiowa 71, sorry about that, that's tail number 136.
1807:45	CO-I	Jeez, man.
1807:47	AC-I	I know. Let's just declare an emergency, man. (One of the pilots moves the altitude alerter out of 35,000, probably to set 24,000.)
1807:49	MAX	Kiowa 71, see you in a little bit. Have a safe flight in.
1807:50	CO-R	Kiowa 71.
1807:51	AC-I	OK, it's pulling out of, it's just totally pouring out of the right side. That's what it seems like.
1807:53	CO-R	Center, Kiowa 71.
1807:55	CTR	Go ahead.
1807:56	CO-R	Sir, we'd like to declare an emergency at this time for a fuel problem and, ah. get to Maxwell quick as we can.
1808:02	CTR	Kiowa 71, roger, you're cleared direct Kiowa … I mean, um. Maxwell, and understand you're declaring an emergency and, uh, you've got a fuel problem. Would you prefer to go to another airport?
1808:16	CO-R	Uh, we can still take Maxwell I believe, we just need to get there quick as we can.
1808:23	CTR	Roger.
1808:30	?-I	What our alternate? (Sounds like someone other than aircrew asked this.)
1808:34	AC-I	Now see, look at the right … look at the right wing, man.
1808:36	CO-I	Yeah, it's just sucking everything out of it, isn't it?
1808:40	AC-I	OK, let's see what's…let's consider another air… airport.
1808:45	CO-I	Oh, I see what you mean … that wing …
1808:46	AC-I	We need to get on the ground, man.
1808:47	CO-I	… the engines? My mistake, my mistake. 91 miles? What's the fuel flow? Are you all the way back at idle?
1809:00	AC-I	Yeah.
1809:05	CO-I	I don't know, Paul. 91 miles at this altitude? It's almost a glide.
1809:08	AC-I	All right.
1809:25	AC-I	Tell them we want lower. I'm not, I'm not stopping at 24.
1809:30	CO-R	Center, Kiowa 71.
1809:32	CTR	Kiowa 71, go ahead.
1809:34	CO-R	Kiowa 71, sir, we need a descent below call sign as quick as we can.
1809:42	CTR	OK, Kiowa 71, I'm working on it.
1809:54	CO-I	Let me see, let me see …
1809:56	AC-I	We need to get down so our fuel flow will drop.
1809:57	CO-I	I know, I know.
1809:58	CTR	Kiowa 71, descend and maintain 17 thousand, the Atlanta altimeter, 29.98.
1810:04	CO-R	29.98, Kiowa 71.
1810:10	CO-I	All right…Are we going to make it? Let me see …
1810:12	AC-I	Now it's down to 8.
1810:14	CO-I	… other options, other options …
1810:16	AC-I	OK, find out …we need to find out what the landing runway is.
1810:18	CO-I	81 miles? I want the straight in… ?
1810:20	AC-I	Runway 15.
1810:22	CO-I	15? We'll go right to a straight base to 15?

1810:24	AGI	Yeah.
1810:30	CO-I	The fuel's gonna go left if it's sucking it down …I think it's as high a rate as you can …That's what it seems …
1810:38	AC-I	I'm trying, you know?
1810:44	CO-I	Yeah, I know, I know.
1810:42	AC-I	Can you, can you set it? Can you set it in there for me? ([the aircraft commander] asks [the copilot] to set the altitude alerter.)
1810:44	CO-I	Yeah.
1810:47	AC-I	Ask him what they're landing, Maxwell's landing.
1810:49	CO-R	Center, Kiowa 71, ah, can you….
1810:52	CTR	71, roger.
1810:55	CO-R	Ah, just … can you find out what Maxwell's landing for us? We'd like 15.
1811:00	CO-I	Kiowa 71, stand by.
1811:10	CO-I	75 miles out. At this altitude, let's see, uh …
1811:14	AC-I	OK, I'm going to shallow the descent.
1811:20	CO-I	Paul, if I transfer fuel … Is there anything wrong with transferring now?
1811:24	AC-I	I wouldn't want to do anything, to tell you the truth.
1811:30	AC-I	I don't understand what's going on.
1811:35	AC-I	It's going to have … it's gonna have an early flameout, Paul.
1811:40	CO-I	I know.
1811:45	AC-I	Let's, um, let's just get set up for the approach … left base.
1811:50	CO-I	What are other runways in the area? Maxine?
1812:00	CO-I	And we're how many miles out? Don't get down so quick, you'll have to level off and push it up again.
1812:06	AC-I	OK.
1812:14	CO-I	I'm reading this … there's, there's Matley field. I'm not sure which that is, but it's down there. And we're only 29 miles from it.
1812:12	AC-I	OK.
1812:20	CO-I	Run out of alternate groups, dude.
1812:22	AC-I	OK.
1812:37	CTR	Kiowa 71, contact Atlanta Center 120 point 45.
1812:41	CO-R	120.45, Kiowa 71.
1812:43	AC-I	Make sure they know we're emergency.
1812:45	CO-I	I will.
1812:47	CO-R	Atlanta Center, Kiowa 71, emergency aircraft out of, 18-four for 17 thousand to Maxwell.
1812:53	CTR	Kiowa 71, 120 point 45.
1812:58	CO-R	Sorry, I didn't switch.
1813:00	CO-R	Center, Kiowa 71.
1813:02	CTR	Kiowa 71, go ahead.
1813:04	CO-R	Sir, emergency aircraft out of 18 for, ah, 17 thousand to Maxwell.
1813:08	CTR	Roger, Kiowa 71, do you need lower at this time?
1813:10	AC-1	Yes.
1813:12	CO-R	Kiowa 71, affirmative, we need to not to have to level off here, yes.
1813:16	CTR	Kiowa 71, say again, do you need lower at this time or not?
1813:18	AC-I	Yes.
1813:20	CO-R	Affirmative.
1813:21	CTR	Kiowa 71, descend and maintain 11 thousand, Maxwell altimeter is 29.96.
1813:22		(One of the pilots moves the altitude alerter out of 17,000, probably to set 11,000.)
1813:26	CO-R	Kiowa 71, 17 for 11 thousand, 29.96.
1813:30	CO-I	29.96 set.
1813:32	AC-I	29.96 set.
1814:00	CO-I	60 miles?
1814:08	CO-I	Paul, let me tell you, don't, let's not configure until we're on final. Real short final. Can we run through the descent check, please?
1814:19	AC-1	Let's find out what the landing runway is. It doesn't really matter, find out what the winds are. I'm just going to take 15. Tell 'em we're taking 15.
1814:23	CO-I	No choice. 60 miles, we should be pretty close. ([The copilot] is probably checking the fuel gauges.) Call them and ask for a closer airfield.
1814:26	AC-I	Huh?
1814:28	CO-I	Call 'em and ask for a closer airfield.
1814:29	AC-I	OK.
1814:31	CO-I	This arrow's just coming down too fast.
1814:33	AC-I	Let's see where one is.
1814:48	CO-I	Ah, Matl- Matley. It's got… in these places.
1814:58	CO-R	Center, Kiowa 71.
1815:03	CO-R	Center, Kiowa 71.
1815:08	CO-R	Center, Kiowa 71.
1815:10	CTR	Kiowa 71, go ahead.
1815:11	CO-R	Center, Kiowa 71, we need ah, we need to change the airfield, to get to the closest piece of pavement we can land on. I'm looking at Moton field. You know anything about that field?
1815:23	CTR	Kiowa 71, we got an airport at ah, 12 o'clock and 12 miles. It's Alexander City. I'll get you a runway length here in just a second. Just stand by.
1815:34	CO-R	OK, Kiowa 71, we need it ASAP, sir, ah, we're not going to have engines shortly.
1815:38	CTR	OK, the runway length at Alexander City is a hard surface at 4400 feet….
1815:42	CO-I	4400?
1815:44	AC-I	2400.
1815:45	CTR	… runway 18/36, at 12 o'clock and 10 miles.
1815:46	CO-I	How much did he say?
1815:48	AC-I	2400 feet.
1815:49	CO-R	Sir, is there anything longer than that around?
1815:56	AC-I	We gotta make Maxwell.
1815:58	CO-I	I don't know if we're gonna make it. Paul, we got 250 pounds here.
1815:59	CTR	Not within, ah, 40 miles, sir.
1816:04	AC-I	Sonovabitch. (whisper)
1816:06	CO-I	How much did he say it had?
1816:08	AC-I	He said 2400 feet. let's see … make sure it's 2400.
1816:10	CO-R	Sir, was that, ah 2400 feet?
1816:13	CTR	OK. the airport at 12 o'clock and, ah, 7 miles is 4400 feet. I have an airport off your right wing and 22 miles is 5400 feet.
1816:23	AC-I	We'll take the one 12 o'clock.
1816:24	CO-R	Sir, we'll take the one at 12 o'clock.
1816:27	CTR	Roger, 12 o'clock and ah…
1816:30	CO-I	Look, just right there, Paul. Right there, Paul.
1816:31	CTR	… actually now it's 1 o'clock and 5 miles…
1816:32	AC-I	I don't see it.
1816:33	CTR	… and you're cleared, ah, for emergency descent down into that airport.
1816:34	CO-I	Drop the spoilers, man, drop them, drop them.
1816:35	CTR	It's Alexander City, 1 o'clock and 6 miles.
1816:37	AC-I	I don't see it, man.
1816:38	CO-R	Kiowa 71, sir, we have it in sight.
1816:40	CTR	Roger, thank you.
1816:41	CO-I	It's right down here, right down here.
1816:42	AC-I	Take the plane.
1816:43	CO-I	I have the aircraft.
1816:45	AC-I	You have the aircraft. Spoilers are out. (Approximately 4 second of audible pitch trim, indicative of extension of spoilers.)
1816:48	CO-I	Right there.
1816:51	AC-I	I don't see it, man.
1816:55	CO-R	Center, Kiowa 71.
1816:57	CTR	71, go.
1816:58	CO-R	Sir, please clear everybody out of our way. We're on, ah, I guess a left base to this runway.
1817:03	CTR	Kiowa 71, roger, you're cleared for, a visual approach.
1817:06	CO-R	Kiowa 71.
1817:13	C0-I	Can you see it?
1817:14	AC-I	Yeah. I think so.
1817:15	CO-I	Look at that.
1817:16	AC-I	Yeah.
1817:16	CO-I	Is that a runway?
1817:17	AC-I	Yeah, it is a runway. Tell you what, man.
1817:18	CO-I	We're not gonna do it.
1817:25	AC-I	How ya going to do it?
1817:27	CO-I	We're gonna do a little 'S' and turn around. OK?
1817:36	CTR	…break. Kiowa 71, contact Montgomery Approach 121.2.
1817:38	CO-I	That's us. 121.2.
1817:39	AC-R	121.2, Kiowa 71.
1817:41	AC-I	You see it?

1817:42	CO-I	I'm looking.
1817:43	AC-I	Right there…You see it?
1817:45	CO-I	Yeah, I gotta turn here.
1817:46	AC-I	OK, we can make a left downwind.
1817:47	CO-I	Hang on, hang on a second. We're too close.
1817:49	AC-I	Can we make it to the runway? … Level off. (Approximately 4 seconds of audible pitch trim, indicative of retraction of spoilers.) You see it?
1817:59	CO-I	We got a heck of an imbalance here.
1818:01	AC-I	Yeah, make a downwind.
1818:09	CO-I	I'm gonna drop the gear and flaps.
1818:14	AC-I	OK, you gonna make a downwind, right?
1818:15	CO-I	Yeah, left base, do a left base.
1818:16	AC-I	12 o'clock.
1818:19	CO-I	Is that for me? Low fuel, Paul.
1818:21	AC-I	I hear ya. I hear ya, man.
1818:23	CO-I	OK. let's get ready for flaps 20.
1818:29	AC-I	I'm transferring forward…. Bring it out, like that, you're gonna…
1818:39	CO-I	How's it look now?
1818:40	AC-1	Looks good, looks good.
1818:49	AC-I	Gear down. Flaps 20.
1818:50	CO-I	Don't put anything down. Nothing down, nothing down.
1818:52	AC-I	OK, don't turn, don't turn….' cause you're gonna be close.
1818:54	CO-I	How am I looking?
1818:56	AC-I	Let's just drop it and go. Let's drop all of it.
1818:57	CO-I	OK.
1818:58	AC-I	Gear down. Gear down.
1818:59	CO-1	No. Stand by. Stand by.
1819:01	AC-I	Gear down. Gear down, man.
1819:02	CO-I	No, not yet, not yet.
1819:06	CO-I	(Gear horn extinguishes, probably as [the aircraft commander] pushed the thrust levers up above 55 degrees.) Paul, push the air-spee… Push the power up a little bit for me. Push the power up for me, bud.
1819:12	AC-I	Gear down, man.
1819:14	CO-I	I can't, Paul.
1819:17	GPWS	Terrain, terrain, terrain. (Sound of gear doors opening and gear coming down.) Terrain, terrain. Whoop, whoop. Pull up.
1819:20	AC-I	All right, all right, make it … that's right.
1819:21	CO-I	Paul. Paul, push the power up. Push the power up.
1819:22	AC-I	All right, man. All right. All right. All right. Stay on the ball. Center the … step on the ball. Step on the ball. Let's make a left turn.
1819:32	CO-I	I got the left turn. I got the left turn.
1819:34	AC-I	No, a right turn. Make a right turn.
1819:36	CO-I	No.
1819:38	AC-I	Right turn, step on the ball.
1819:40	CO-I	Right turn, right turn.
1819:42	AC-I	Step on the ball, power's coming up. Step on the ball. Step on the ball, power's coming up.
1819:56	CO-I	Paul, I can't. I can't turn.
1820:00	AC-I	OK. Make a left turn. Make a left turn. (Sound of whining down on CVR channels 1 and 4.)
1820:03	CO-I	Paul, I can't.
1820:05	AC-I	I'm pushing the rudder. I'm pushing the rudder.
1820:11	CO-I	Paul, do I have any engines? Paul, no.
1820:13	AC-I	Yes.
1820:14	CO-1	Not so fast. (Yaw damper disengages.)
1820:16	AC-I	Yes, yes, you have engines. (Sound of whining up then down on CVR channels 1 and 4.) You have engines. You have engines. We need engines.
1820-22	CO-I	Paul, what…?
1820:23	AC-I	We need engines. We need engines. Step on the ball.
1820:26	CO-I	Paul, I have no … Paul, no, no. ([The aircraft commander] steps on the left rudder against [the copilot's] right rudder.)
1820:27	AC-I	Yes. Yes. Step on the rudder. Step on the rudder.
1820:28	CO-I	Paul. no. Paul. Paul, don't.
1820:32		(Impact approximately 31:40 from CVR start time.)

Source: U.S. Air Force ◆

Good Show

Corporal Dwayne Mercer, Corporal Luc Tanguay, Private Craig Brake, Master Corporal Rick Copeland, & Master Corporal Craig Pomeroy

Corporal Mercer, Corporal Tanguay, and Private Brake were the servicing crew tasked to monitor the routine shutdown of a Sea King aircraft. During the blade-fold sequence flames suddenly erupted from the starboard side of the main gearbox and quickly started to spread. Corporal Mercer immediately signaled the aircrew of the danger and ordered all personnel away from the aircraft.

Master Corporal Copeland, who was observing the shutdown from the hangar, grabbed a fire extinguisher and as indicated by Corporal Mercer proceeded to fight the fire on the starboard side of the aircraft. Corporal Tanguay and Private Brake sprinted to retrieve another fire extinguisher and returned to fight the fire from the port side. Master Corporal Pomeroy, who was also watching the aircraft shutdown, grabbed a third fire extinguisher and assisted with the fire fighting. All involved continued to suppress the flames until the arrival of the fire fighters.

The initiative, professionalism, and courage demonstrated by Corporal Mercer, Corporal Tanguay, Private Brake, Master Corporal Copeland, and Master Corporal Pomeroy prevented the Sea King from being engulfed in a conflagration. Their actions ensured the safe egress of the crew and prevented the destruction of a valuable aircraft. *Well done!* ◆

Captain Gerard C. Caron

During an introductory low-level navigation-training sortie Captain Caron spotted bird activity along the intended flight path of the aircraft. He promptly advised his instructor who immediately commenced an evasive manoeuvre. Despite the instructor's efforts the bird entered the Tutor's intake destroying the engine. Following proper, albeit unsuccessful, attempts to restore engine power the crew ejected.

During the ejection sequence Captain Caron's seat collided with his opening parachute and became severely entangled in the shroud lines and canopy material. The interference prevented the canopy from opening correctly and a rapid rate of decent developed. Captain Caron, an experienced parachutist, felt the chute's risers slapping him on the neck. Knowing that 'riser kisses' indicated that his parachute had streamed, Captain Caron forced his eyes open, looked up, and saw his ejection seat entangled in the unopened parachute. Realizing that inaction meant death, Captain Caron grabbed as far up on the risers as he could manage and separated them — performing what gymnasts refer to as an 'iron cross'.

Several seconds later Captain Caron felt a small tug on his harness indicating that some air had entered the parachute. Despite the rapid rotation caused by the air being dumped out through two gaping holes in the sixty percent inflated parachute, Captain Caron estimated that his parachute inflated at fifty feet above ground level. He realized that the time remaining would be best served adopting an optimal landing position. Despite a thirty-five foot per second rate of decent Captain Caron's decision allowed him to survive the impact, although he sustained severe injuries.

Captain Caron's truly outstanding performance in incredibly trying circumstances undoubtedly saved his life. His actions also contributed to the implementation of a training programme that may well prevent future loss of life under similar circumstances. *Well done!* ◆

From the Trenches

1

On the morning of the incident, a maintenance technician asked the squadron ops section if he could submit his name as a passenger. About 15 minutes later, he was informed by the OPS SNR NCM that there was a scheduled dual A/C with an empty rear seat for a late afternoon mission.

The maintenance technician asked his immediate supervisor, a junior NCM, if he could be freed from his duties for the duration of the flight. His supervisor approved the request.

Subsequently, the technician went to the squadron safety systems shop to be fitted with flying gear. The newly arrived safety systems shop technician asked the technician, a first time flyer, if he had his HAI and a seat check done. The technician answered positively to the first question and stated that quote I worked at the seat shop for a few months unquote, implying that he had a lot of knowledge about the seat. Further investigation revealed that the technician was aware of the seat check requirement. He was also aware that the fact of working at the seat shop did not exempt him from having to do a seat check.

After the fitting session, the technician was informed by OPS SNR NCM that he was scheduled to be a passenger for a rear seat flight at around 1700 hrs local. Subsequently, the OPS SNR NCM asked the member quote do you have your HAI, a valid medical and seat check unquote. The technician answered positively to all the questions. As he gave the answer, the acting CO and the aircraft captain were present and clearly understood the answer given by the technician. This took place around 1430 hrs local.

Since he had time available before the flight the technician contacted seat training shop to get a seat check.

At the seat shop, he was informed that it would be impossible to have a check done due to the unserviceability of the seat training aid. The technician decided to get back to the squadron for 1620 loc and take time to familiarize himself with emergency procedures. As he got to the squadron, he saw the pilot who seemed to be surprised that his passenger was available so early. The pilot decided to advance the sign out time and made the appropriate arrangements to do so.

The pilot invited the technician into the ops office and asked him a few questions such as the procedure to follow in case of an emergency ground egress as well as the cockpit layout. The technician did not know any of the answers. Questionning the quality of the seat check, the pilot spent 40 minutes giving the technician a thorough briefing on emergency procedures and cockpit layout at the ops desk and on the A/C. The pilot queried the technician on who gave him the seat check. The technician answered by naming the technician from the sqn safety system shop. Subsequently the pilot made the technician recite several times the ground egress procedure until he was confident that the passenger knew the procedure properly.

After A/C pre flight check, the A/C T/O without incident. An hour into flight, the technician admitted to the pilot that he had not done a seat check. The pilot completed his mission and landed. Post landing, the pilot asked the technician to safe his seat and put the safety pins in. The technician had some trouble installing the ejection seat pin but finally was able to do so. The pilot queried the technician if the seat was safe, the answer received was quote yes unquote. After shut down, the pilot inspected the rear seat and found the ejection seat safe/arm handle was in the arm position with all the pins installed. Pilot put the safe/armed handle to the safe position wfi. Further investigation revealed that even though the technician involved was asked if he had a valid medical, he once again was not telling the truth. However, he did have a valid HAI.

2

During a CH handling prof, the pilot was experimenting with different methods of rudder reversals and departed the A/C. Doc red page response was carried and A/C recovered at 5000 feet AGL. A/C RTB WFI.

Editor's Comment: Now that's a clever aircraft! ◆

Letters to the Editior

Dear Sir:

I have just had the pleasure of reading your Winter 2000 issue, which was sent to me through the courtesy of Ms. Judy Wilson, the editor of Flightfax. Kudos to your translator-the tone of the article was intact, I learned a new idiotisme militaire or two, and several phrases were more nicely-turned than in the original. Thank you for reprinting "The Devil is in the Details…" (the original title): if I had known it would be receiving international exposure, I would have given it a tad more polish.

As an Aviation Safety Officer, I'm always pleased to see a publication which gives due recognition to the maintenance members of the aviation team; those of us who slip the muddy clutches of earth would find our flights — and often our lives — cut somewhat short if it were not for the conscientious efforts of those folks who trust us to return "their" aircraft in a reasonably flyable condition. General S.L.A. Marshall held that there were times when just doing one's duty was deserving of a medal; there now appears to be a cultural shift in military aviation toward recognizing that the mechanic who performs with quiet consistency is just as vital to aviation safety as the one who goes "above and beyond the call." This, as one of my fellow instructors is fond of saying, is a Good Thing.

However, as an Aviation Safety Officer in the United States Army, I am envious of the scope and quality of your publication, the likes of which we haven't seen in the US Army since the decade-agone demise of Aviation Digest. And it would also seem that, despite the Pentagon's proclamations to the contrary, it is actually Canada that has taken a commanding lead in military digitization and IT application, since it appears that neither Flightfax nor Approach possess the technology needed to identify me as 13111 Tuttle — they just called me "Bill."

Thank you again for considering my article worth the space in Flight Comment/Propos de vol. The only nit I have to pick is with the illustration — the artist omitted my moustache.

– William S. Tuttle
CW4, NJARNG
Aviation Safety Officer,
1st Battalion-150th Aviation ◆

Hi Michael Phelan,

I enjoyed reading your letter to the editor in the Winter 2000 edition of Flight Comment. While I've been out of the Air Force for 20 years I understand your frustration because it was the same back during my time in the 1960-70's. In fact, we used to make up our own: TAL, ACM, BFM, etc.

Unfortunately, things are no different today out here on Civvy Street. I am an airline pilot and am constantly bombarded with acronyms like ECAM, TCAS, EFIS, ELAC, and on and on and on. Just when I think I've heard them all, another one pops up. What's DIRPM 2-7-4?

– Cheers,
Doug Moore
DC-10 Pilot
Canadian Airlines ◆

Good one! I plead guilty.

DIRPM 2-7-4 is code for me. It is called my designation. It is also the position I occupy. It means I work in or under the Sub-section called 7 (there may not be a 6 or any other) of Section 2 (there never is a Section 1) of the Directorate of Information Resource Product Management. In this case the 4 indicates me personally, but in some cases it might mean something different. A designation also has different connotations under different circumstances. We usually employ designations instead of titles. In private industry, I would be called a Systems Analyst.

I assumed Flight Comment was a Department of National Defence internal publication, and that its readers would know the significance of DIRPM 2-7-4. I assumed wrong, just like most people do when they use acronyms or jargon.

My first attempt to answer Mr. Moore's question went on for over three pages, not including postscripts! I explained that a code under a signature 'usually' indicates where the person works.

I explained some of the many problems that arose from this jargon, and the time and money wasted daily. I argued that if this code required three pages to explain its various meanings and connotations, we would be better off not using it. I offered an alternative that would give the same information in a much clearer but still short form, without the associated problems.

I tried to convince the editor of Flight Comment that it was all relevant to his fine magazine, but not surprisingly he didn't buy it. He admitted it was all very interesting, but unfortunately it was much too long to print as a letter. Thus this shorter version.

To summarize how it all affects my life as a pilot: As a Systems Analyst, I am inundated with acronyms and jargon from the computer world. As an employee of DND headquarters, I get a double dose. As a pilot, I get a third dose, and some day I am simply not going to bother anymore when I see a new acronym. I know that many pilots are already suffering from

Continued on page 20

Epilogue

TYPE: **CH146495 Griffon**
DATE: **12 January 1999**
LOCATION: **Valcartier QC**

The crew was conducting a VFR proficiency flight in the Valcartier training area. The aircraft departed the ramp area and was positioned for an approach to the Valcartier tactical strip. As the aircraft approached the ground, the rotorwash caused a white-out (snowball) condition due to the re-circulation of the surface snow. The crew lost visual reference with the ground and drifted into the trees on the edge of the landing strip. Upon hearing the sound of rotors contacting trees, the Aircraft Captain (AC) lowered collective and landed the helicopter. The aircraft sustained D Category damage.

For the First Officer (FO) and the Flight Engineer (FE), it was the first flight after several weeks leave (Christmas break) and neither had experience with landing in snow conditions. The AC elected to let the inexperienced FO fly the first approach without benefit of a pre-flight briefing on or demonstration of the proper technique for landing in obscuring phenomena. This clearly indicated a lack in mission planning on the part of the AC and a break down of effective Crew Resource Management (CRM) amongst the crew.

All three members of the crew had received CRM training in the 18 months previous to the occurrence yet none of these techniques were effectively employed. The investigation revealed that the CRM program is in need of review with regard to course content and recurrency requirements. CAS has directed the Comd 1 CAD to conduct an evaluation and validation of the CRM concept, training standards and training program to ensure the operational requirements of all air force communities are met.

As an immediate result of this occurrence the unit conducted a review of the techniques applicable to flight in obscuring phenomena. Squadron aircrew participated in a formal one day CRM lecture given the second week of February 1999 and recurrent training was conducted in February 2000. The Commander 1 Wing is implementing a program to ensure that all 1 Wing aircrew are given additional training in CRM and risk management.

During the course of the investigation it was discovered that some of the crew had self-medicated with common cold remedies. Although difficult to quantify, the drugs that were detected in the crew could have adversely affected their reactions in the cockpit. In addition, a non-flight surgeon qualified civilian physician on contract to the base prescribed one of the crew a drug that was not recommended for aircrew use.

The unit Flight Surgeon and Base Flight Safety Officer conducted a review of the rules regarding self-medication during a flight safety meeting with the whole squadron. CAS has tasked 1 CAD to review the distribution and number of qualified flight surgeons in Valcartier as well as review the procedures which civilian doctors follow when treating aircrew.

This is not a new occurrence, simply new individuals repeating a previous event. This was an expensive reminder of the need to properly brief and demonstrate the sequences to be executed in a planned training flight. ◆

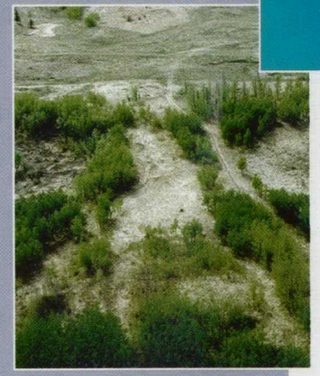
Epilogue

TYPE: **SAR Tech Parachute Injury**
DATE: **05 May 1998**
LOCATION: **Red Deer, Alberta**

A regional SAREX was being conducted near Red Deer, Alberta. On the second day the mission included two separate personnel parachute drops into a pre-selected confined area DZ using the CSAR 4 Ram Air steerable canopy.

The accident SAR Tech was scheduled as the lead jumper in the second personnel drop. The second personnel drop was planned as a two-man drop with both SAR Techs wearing full equipment and the SAR Personal Equipment Lowering System (SARPELS).

The SAR Tech exited the Hercules at 2000 feet AGL. Winds at altitude were 30 Knots decreasing to 15-20 Knots at tree top level and 4-7 Knots on the ground in the DZ. As he neared the upwind end of the confined area, he turned into wind to hold briefly in the 'full glide' parachute configuration. He then commenced a left turn onto a downwind leg paralleling the DZ. Several seconds later he applied full left toggle to commence a continuous 180-degree turn for a landing in the DZ. The latter portion of the turn became a "HOOK" turn — a spiralling steep bank manoeuvre which pendulums the parachutist outward and increases the horizontal velocity and the rate of descent. While still in this turn, the accident SAR Tech cleared the 35-foot trees, impacted the ground and sustained serious injuries to both legs. This occurrence was therefore categorised as an E Cat Accident. The investigation is now complete.



The investigation focussed its attention on the currency and proficiency of the SAR Tech involved in the accident.

Between August 1994 and October 1997, the SAR Tech was posted to a Combat Support Squadron. During this period he was able to maintain his CSAR-4 jump qualification by completing only 4 jumps and therefore bypassed CSAR 4 re-certification training upon his return to a fixed wing SAR unit.

The investigation revealed that the SAR Tech's currency and proficiency was deficient. He had never before attempted a CSAR 4 descent into a confined area while wearing the SARPELS. As well, his last confined area jump was 49 months prior to the accident.

The final 180° turn was conducted below the minimum altitude prescribed for such maneuvers. Although an analog wrist altimeter was available for use by the SAR Tech community, its design rendered it ineffective in assisting with altitude determination while flying the final portion of a parachute descent. A more effective digital wrist altimeter has since been tested and procured, its use is mandatory except for intentional water jumps.

The investigation also revealed several inconsistencies in the guidance and restrictions given in the applicable CFACM and the CSAR 4 Training Precis used at the CF School of Search and Rescue with respect to approach pattern altitude and distance control.

As this was the eighth occurrence involving a SAR Tech suffering a serious injury as a result of a CSAR 4 parachute descent since 1993, the in-depth analysis conducted in this investigation was necessary. Hopefully this will prevent further losses in operational capability and the pain and suffering associated with the resulting injuries. ◆

Epilogue

TYPE: **CH146486 Griffon**
DATE: **7 December 1998**
LOCATION: **Owen Sound ON**

Aircraft CH146486 departed the Owen Sound airport at 2310Z for a Night Vision Goggle (NVG) formation training sortie. Shortly after take-off the flying pilot (right seat) experienced a 'wash out' of his NVG and transferred control of the aircraft to the non-flying pilot. Moments later, the #2 'ENGINE OUT' light illuminated and the #2 Inlet Turbine Temperature (ITT) climbed rapidly. The crew turned back to the airport and then the #2 engine "FIRE" light illuminated on short final to the runway. The crew initiated the checklist procedure for an engine fire, executed a run-on landing and emergency shutdown and egressed the aircraft without incident. The aircraft sustained D Category damage due to the overheat condition in the #2 engine.

An engine overheat condition can occur if too much fuel is metered to the combustion chamber. Excess fuel would most likely be traced to a failed Fuel Control Unit (FCU) or improper selection of the FCU operating mode (Governor switch). Technical analysis of the powerplant and its components did not reveal any electrical or mechanical anomaly to explain the engine malfunction and fire. The investigation subsequently focused on the possibility of an improper selection of the FCU operating mode. In-flight selection of the GOVERNOR switch from AUTOMATIC to MANUAL mode with the throttle in the full open position will cause the FCU to meter 6 times the normal amount of fuel to the engine.

The crew took-off with the HUMS (Health Usage Monitoring System) Permanent Blade Tracker switch in 'Night' mode. When the HUMS system took an automatic sampling of the blade track, an infra-red beam was projected vertically into the blades from the sensor located on the nose of the aircraft in front of the right seat pilot (flying pilot). This caused the 'wash-out' of his NVG. Placing the mode switch in 'Day' prevents the projection of the IR beam. The HUMS 'mode' switch is located at the top right side of the centre pedestal. The #2 engine Governor 'mode' switch is located directly below it on the same console. Analysis of the Cockpit Voice Recorder (CVR) tape indicates the right seat pilot's 'wash-out' problem was rectified co-incident with the initiation of the engine emergency. Although the right seat pilot does not recall selecting the HUMS mode switch during the departure from the airport, the possibility of an incorrect switch selection on the part of the crew was investigated.

If the right seat pilot moved the HUMS mode switch from 'Night' to 'Day' (aft movement), one would expect to get the result heard on the CVR (wash-out problem rectified). If he moved the Governor switch to 'MANUAL' (aft movement), then one would expect the results seen in the engine.

The Governor switch was tested to determine if it could be inadvertently moved during selection of the HUMS mode switch. It was impossible to move the Governor switch without consciously lifting the switch first (over-centre lock). The Governor switch is also the only switch in the cockpit that has a unique triangular top. Although it is possible to make an incorrect switch selection from a human factors perspective (topographic misorientation), it would seem unlikely based on the function and shape of the Governor switch. The aircraft was configured in AUTOMATIC governor for takeoff and the right seat pilot stated that MANUAL governor was not selected in-flight. The investigation team was unable to determine whether or not the overheat condition was caused by an improper selection of the FCU operating mode (Governor switch). The events which precipitated the engine malfunction and fire could not be determined.

Several deficiencies were discovered during the course of the investigation which required corrective action. When the #2 engine failed, the #2 generator fell off line causing the non-essential bus to de-energise. When the non-essential bus de-energised, the co-pilots instrument lighting extinguished and the #2 and #3 radios were temporarily unavailable. These two design characteristics are being investigated by the technical and operational authorities to determine if there are any procedural or engineering changes required.

1 Wing has initiated a modification of the Griffon Checklist and Flight Manual to specify functionality of the HUMS mode switch and to indicate that the switch shall be selected to "Day" mode for all flights unless specific requirements dictate otherwise.

As part of the emergency shutdown and egress, the crew engaged the rotor brake above 40% rotor RPM. This resulted in considerable cost in parts replacement due to the sudden stoppage of the drive train. The technical and operational authorities are reviewing this practice to determine continued applicability. ◆

From the Investigator

TYPE: **Schweizer 2-33 Glider C-FEAF**
DATE: **14 May 2000**
LOCATION: **St-Jean-sur-Richelieu, Quebec**

The glider was being flown in support of the Eastern Region Spring Familiarisation Flying Program at the St-Jean-sur-Richelieu Airport near Montreal. The pilot was a member of a local Air Cadet Squadron and was building time in order to be qualified as a Familiarisation Pilot. Immediately prior to the accident flight he had received a check ride from a Glider Instructor and then had proceeded on a solo flight. This flight was his fifth this season.

After a normal tow to 2500 feet above sea level (ASL) followed by some upper air work consisting of gentle and medium turns, the pilot joined a left downwind for the paved strip parallel to runway 29 at 1300 feet ASL. The elevation of the St-Jean airport is 136 feet ASL. Surface winds were reported by the St Jean Tower as 290° Magnetic at 20 Knots. After turning base leg at 900 feet ASL and opening the spoilers to half, he maintained a speed of 67-70 mph. After turning final he noted that he was low and closed the spoilers.

The left wing of the glider struck two trees approximately 30 feet AGL. The first, smaller impact at the wing tip initiated a slight flat turn to the left. The second, more severe impact at mid-wing caused the glider to pivot rapidly to the left in a flat attitude.

The glider turned 180° and the tail raised as the glider was travelling backwards at this point. The glider struck the ground in approximately a 70° nose down, wings level attitude, about 75 feet upwind from the tree it originally struck. The wind, blowing from the bottom of the glider then pushed the fuselage past the vertical to a 45° inverted attitude when the wings came to rest against some trees. The pilot unstrapped and egressed from the rear left window.

The glider came to rest approximately 1300 feet from the normal touchdown point on the gliding site. The accident occurred at 1415Z (1015 Local) during daylight hours.

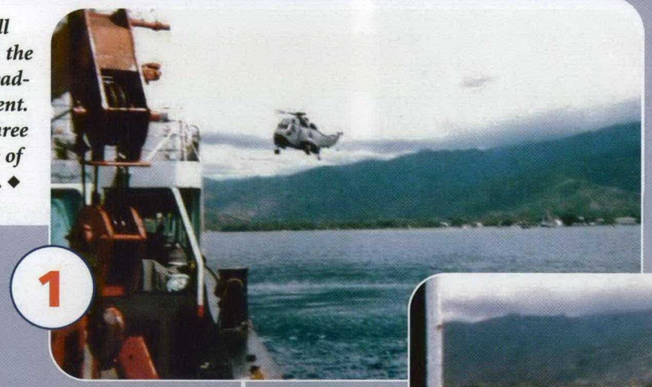
DFS Remarks

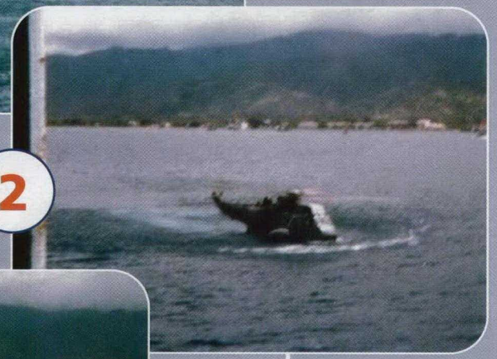
We were indeed fortunate that the injuries suffered in this accident were limited to some minor cuts and bruises. Once again the robustness of the glider used in the Air Cadet Gliding Programme and the four-point harness securing the occupant saved him from more serious physical injuries.

This investigation is continuing. It is focussing on aircraft handling in high winds and on the perceived need to land as close as possible to the launch point so as to not impede the operations of the site. ◆

Sea King East Timor

Most readers will be familiar with the circumstances leading to this incident. The following three photographs are of the actual event. ◆





Letters… Continued from page 15

acronym overload and, as Mr. Moore's letter suggests, it is worse the higher you go on the licencing ladder (I recognize only two of the seven examples he gives). At National Defence, we could make better use of the taxpayers' dollars. As pilots, we could better use our time to study about safety and to practice flying.

–Michael Phelan

Special thanks to Gerry Howland for editing this and my previous letter to Flight Comment. His designation does not appear here. I think he prefers to be considered as a person.

Postscripts:

1. No, I will not divulge what DFTE stands for, not yet anyway. I am still waiting for one person to tell me they knew what it meant before I raised the question in Flight Comment (Winter 2000). So far, no luck.
2. For anyone interested in my original version (containing my idea of a little humour to compensate for the length), please request it by email to me: **m.phelan@debbs.ndhq.dnd.ca** ◆

For Those Now Lost

As you raise a glass on high
And cast your longing toward the sky
And think yourself no mere mortal to be
Who dares deny earth's gravity

Go fly your craft with thrilling speed
With skill and courage, do your deed
But, think not on chance, that erstwhile friend
To save you from your mortal end

For to fly is to defy that earthly grip
And chance awaits your unfortunate slip
Then aims to bring you back to ground
Where man for eons footsteps pound

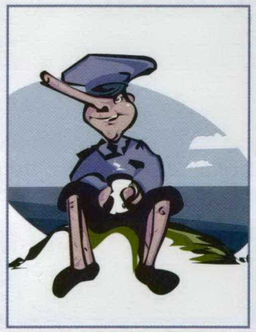
And remember those we've laid to rest
We've counted some as our very best
'Tis not chance, skill, daring or fears
But ceaseless vigilance that guards your years

–Lieutenant Colonel Whiteley

The 40 Greatest Lies in aviation

All that turbulence spoiled my landing.

1. Me? I've never busted minimums.
2. We will be on time, maybe even early.
3. I have no interest in flying for the airlines.
4. I fixed it right the first time, it must have failed for other reasons.
5. All that turbulence spoiled my landing.
6. I only need glasses for reading.
7. I broke out right at minimums.
8. The weather is going to be alright; it's clearing to VFR.
9. Don't worry about the weight and balance - it'll fly.
10. No fault found.
11. The jet's ready.
12. If we get a little lower I think we'll see the lights.
13. I'm 22, with a four-year degree and 3000 hours on type.



I wouldn't want to fly F15's, F16's, Eurofighter... (any non-CF jet).

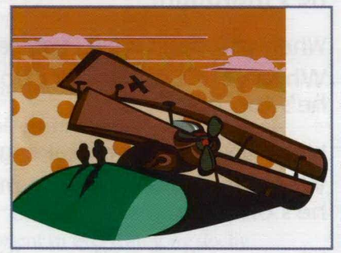
14. We shipped the part yesterday.
15. All you have to do is follow the book.
16. This plane outperforms the book by 20 percent.
17. We in aviation are overpaid, underworked and well respected.

I'm 22, with a four-year degree and 3000 hours on type.

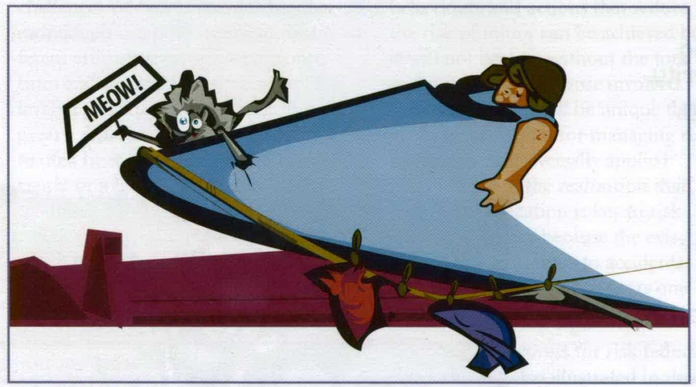
18. Oh sure, no problem, I've got 2000 hours in that aircraft.
19. I wouldn't want to fly F15's, F16's, Eurofighter...(any non-CF jet).
20. I have 5000 hours total time, 3200 are actual instrument.
21. No need to look that up, I've got it all memorized.
22. Sure I can fly it - it has wings, doesn't it?
23. We'll be home by lunchtime.
24. Your plane will be ready by 2 o'clock.
25. We fly every day - we don't need currency training.
26. I always make the basket first time, every time.
27. It just came out of servicing - how could anything be wrong?
28. I thought YOU took care of that.
29. I've got the field in sight.
30. It's a staff ASSISTANCE visit.
31. I've got the traffic in sight.
32. Of course I know where we are.

The jet's ready.

33. I'm SURE the gear was down.
34. We understand your problem and are doing something about it.
35. Flying competence is important, secondary duties don't get you promoted.
36. I've never done a fly-by.
37. Of course I made the switches live.
38. I'm aircrew, I'm not interested in promotion.
39. Trust me, I'm a navigator.
40. I have friends; I'm a Hornet pilot.



Sure I can fly it — it has wings, doesn't it?

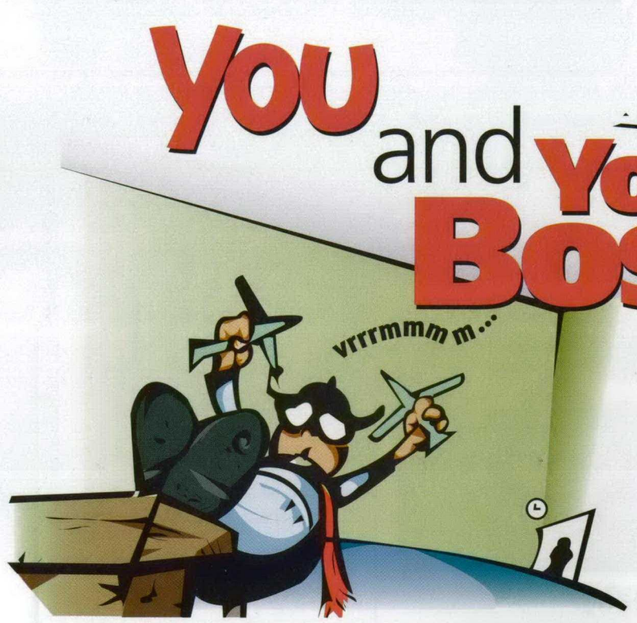


If we get a little lower I think we'll see the lights.

Reprinted courtesy *RAF Air Clues*, slightly modified by *Flight Comment* editorial staff.

– Got any other good ones? E-mail the editor with your submission. Utmost discretion is assured. ◆

Differences Between **You** and **Your Boss**



When you take a long time, you're slow.
When your Boss takes a long time, he's thorough.

When you don't do it, you're lazy.
When your Boss doesn't do it, he's too busy.

When you make a mistake, you're an idiot.
When your Boss makes a mistake, he's only human.

When you do something without being told, you're overstepping your authority.
When your Boss does the same thing, that's initiative.

When you take a stand, you're being pig-headed.
When your Boss does it, he's being firm.

When you overlooked a rule of etiquette, you're being rude.
When your Boss skips a few rules, he's being original.

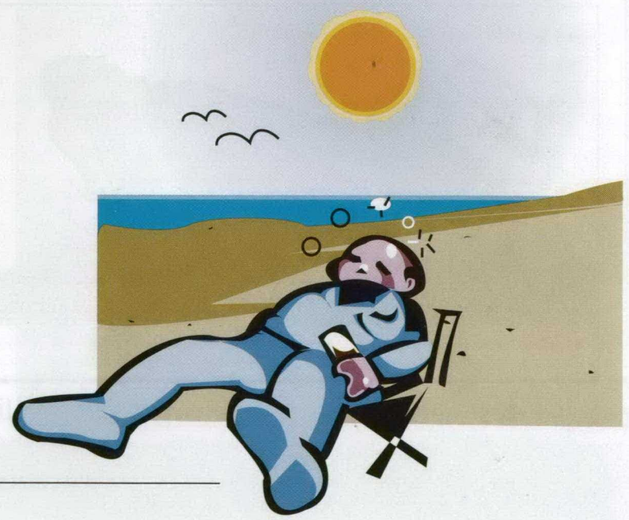
When you please your Boss, you are obsequious.
When your Boss pleases his Boss, he's being co-operative.

When you're out of the office, you're wandering around.
When your Boss is out of the office, he's on business.

When you're on a day off sick, you're always sick.
When your Boss has a day off sick, he must be very ill.

When you apply for leave, you must be going for an interview.
When your Boss applies for leave, it's because he's overworked.

Reprinted courtesy of *RAF Air Clues*. ◆



Smart Risk Revisited

Several years ago I wrote in this publication an article outlining an idea called "Smart Risk". In it I challenged all members of the Air Force to modify their habit patterns when taking risks by adopting a lifestyle in which risk is not only both understood and accepted but where smart decisions to minimize those risks are consciously taken.

Since that time the philosophy of "Smart Risk" has become an integral part of both the Basic Flight Safety and Flying Supervisors Courses. While progress has obviously been made in getting this message out, any cultural change takes time, so perhaps it would be appropriate to revisit this concept.

Let's face it, life would be terribly boring if we did not take risks and, while we may not consciously think about it, every activity we undertake has some degree of risk associated with it. An unfortunate side effect of that reality is that this ever-present risk can make us de-sensitized or complacent to some risks. One of the greatest challenges we face is recognizing that individuals can have significantly different attitudes between what constitutes an "acceptable and necessary" level of risk for any given task. Too great a difference in opinion on the matter, be it a result of previous experience or a hidden agenda, can create an unnecessarily hazardous working environment, an environment that could be the home, driving on the roads or working on the flight line. The individual who coined the phrase "never fly with anyone braver than you are" knew what he was talking about.

Unnecessary risk taking can be alleviated considerably if we adopt a smart approach to risk taking that begins from the moment we get up in the morning and continues without break until we go back to bed at night. Only by encompassing the total environment in which we live, and all those individuals with whom we interact, can we create a risk prevention lifestyle.

One of the best risk reduction tools which we can use to help us make sound decisions is the Risk Management process as practiced within the Flight Safety community and outlined in AGA 135. This Risk Management process is straightforward and eminently suitable for use at work or in the home. Remember it is every bit as important to safely and successfully return home with your family after a weekend of camping at the lake as it is to deploy on exercise and return.

The creation of an environment in which people both value and practise behaviours and actions that reduce the risk of injury can be achieved but it will not happen without the total commitment of all those involved. While every case will be unique there are basic principals for managing risk which can be universally applied beginning with the realization that hazard identification is key to risk reduction simply because the existence of hazards leads to accidents. Therefore to prevent accidents one must first identify hazards.

The five-step process for risk reduction, which is also illustrated in this month's poster follows:

a. all the hazards must be identified

b. the identified hazards must be converted into risks by assessing them in terms of probability, exposure and severity

c. once the risks have been ascertained then various control options, which will be affected by feasibility, affordability and effectiveness, must be determined;

d. now you must decide which option is most suitable to your situation depending on whether the risk is being eliminated, reduced or ignored; and finally

e. all control options must be monitored and reevaluated periodically.

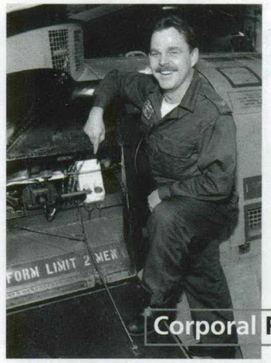
That is the goal behind the "Smart Risk" concept, to manage risk, which is present in everything we do, by making smart decisions so that we can continue to take risks over and over again. Regardless of the operational imperative, be it putting bombs on target or taking the family to the mall, a continued ability to fulfill our goals will greatly add to the enjoyment we take in our daily lives.

Life is all about choices and in this case your ability to choose to adopt a safe lifestyle could have a significant effect on you, your families and all those other people you interact with.

– *Major Steve Camm* ◆

For Professionalism

While conducting an after-flight check on a Sea King helicopter, Corporal McMullin noticed that the corrosion preventing hard coating had cracked around the two forward bolts of the main gearbox mounts. He also noted that the washers under the head of the bolts could be turned freely. It appeared that the bolts were too long and had bottomed out in the airframe mount leaving a small gap between the bolt head, washer, and the airframe mount.



Corporal Rob Mcmullin

Corporal McMullin elected to investigate further. Positive identification of the proper bolt was difficult — all were stamped with an incomplete part number and then stored and issued in bulk quantities. Furthermore, the bolts on the helicopter remained completely coated with anti-corrosion compound. Despite the obstacles to his investigation, Corporal McMullin ascertained that the two forward bolts were intended for a different series of main gearbox. A fleet survey was carried out and confusing maintenance instructions were amended.

Six bolts attach the main gearbox of the Sea King helicopter to the airframe. Corporal McMullin's vigilance and perseverance eliminated a potentially lethal safety hazard. *Well done.* ◆

Master Corporal Jamie Antle

While conducting a quick turnaround check on a Hornet aircraft, Master Corporal Antle thought he noticed something abnormal about the ejection system. Closer examination showed that the main parachute shackle was not locked into the scissor mechanism of the parachute. Master Corporal Antle immediately brought notice of the discrepancy to his supervisor and a flight safety report was raised.

Further investigation revealed that the parachute assembly had been unserviceable for approximately ten flying hours. The proper installation of the shackle is crucial in ensuring the correct ejection sequence of the parachute. During a high speed or high altitude ejection the parachute would likely have deployed prematurely.

Master Corporal Antle's professionalism and attention to detail resulted in the discovery and elimination of a significant flight safety hazard. *Well done.* ◆

Corporal Smith and Corporal Sweet were tasked to replace the pilot's skylight window of an Aurora aircraft. While removing the unserviceable pane they detected a small amount of moisture on one area of the seal where it met the frame of the aircraft. The presence of moisture on an apparently undamaged seal is not addressed in technical orders. Although the situation could have been easily ignored they decided to remove the entire seal to inspect the underlying structure.

Corrosion was discovered in three separate areas between the seal and the structural frame of the aircraft. In one of the areas the corrosion had progressed to the point where the damage was beyond normal tolerances. A complete replacement of the affected ring segment was required.

Corporal Smith and Corporal Sweet demonstrated superior professionalism and initiative by electing to take the extra effort to ensure the aircraft was serviceable. Their actions likely prevented a structural failure and a potentially hazardous in-flight emergency. *Well done.* ◆

Corporal Patsy Sweet & Corporal Brian Smith

Corporal David Rattliff & Corporal Elvira Monique Glanvill & Corporal Gerald V. Fehr

While preparing a Hornet aircraft for operations over Kosovo, Corporals Rattliff, Fehr, and Glanville thought they heard an unusual noise emanating from the area of the electronic warfare jamming system. Fault finding with the test set produced no results. Knowing that the aircraft was soon to be deployed they decided to investigate further.

An exhaustive examination revealed an unseated pin in a plug on the receiver portion of the electronic warfare jamming system. The fault is invisible to the pilot during flight operations and is undetectable by the test set. Had the condition remained undetected, both rear quadrants of the system would have been unable to receive, process, and adequately jam hostile threats.

Corporal Rattliff, Corporal Fehr, and Corporal Glanville demonstrated superior alertness and dedication by identifying and eliminating a fault that could have had catastrophic results while the aircraft was engaged on operations. *Well done.* ◆

Corporal Gerard Morgan

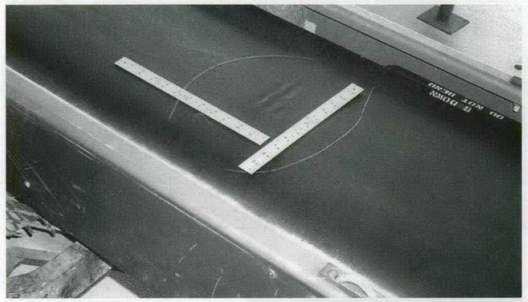
Corporal Morgan was tasked to conduct a primary inspection of a Buffalo aircraft. During the inspection he noticed rub marks on the upper edge of the forward-facing surface of the left flap. After notifying his supervisor, Corporal Morgan initiated a detailed search for the source of the contact.

When the aileron was placed in the full down position, Corporal Morgan noted that the bolt in the attaching hardware of the push-rod appeared too long. Consultation with technical orders, and the three extra washers found under the nut, confirmed Corporal Morgan's suspicions. Further investigation showed that the right-hand push-rod was also installed with the incorrect hardware — one that was too short. The extra long bolt had come within millimetres of interfering with the exit opening; as well as coming dangerously close to snagging on the aileron cable. Further evidence indicated that the fault had existed for a considerable length of time. Corporal Morgan then developed a local special inspection and two more incorrect installations were discovered on other Buffalo aircraft.

Corporal Morgan's diligence, dedication, and superior professional attitude resulted in the elimination of a significant and potentially lethal safety hazard. *Well done.* ◆

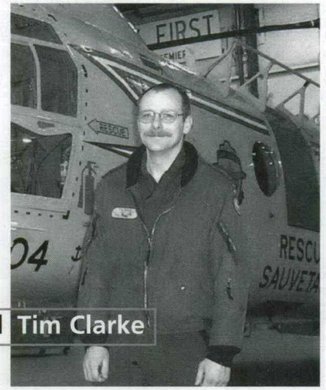
For Professionalism

During the towing of a Labrador helicopter, Master Corporal Clarke thought he noticed a deformity on one of the aft rotor blades. Unable to confirm his suspicion from ground level he decided to utilize a maintenance platform to carry out a closer inspection of the blade. Master Corporal Clarke's examination revealed significant de-lamination on the top and bottom sides of the blade. He immediately notified his supervisor and the aircraft was declared unserviceable.



Further research by the rotor blade repair shop revealed that the blade had been over-pressurized by excessive water ingestion. The over-pressurization had resulted in blade warping and de-lamination. The deformity was virtually undetectable from ground level.

Master Corporal Clarke demonstrated superior attention to detail and professionalism. His actions eliminated the potential for a catastrophic blade failure. *Well done.* ◆

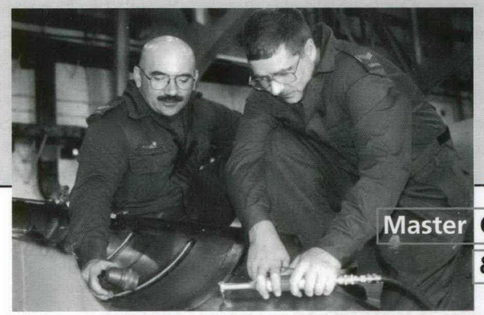


Master Corporal Tim Clarke

Master Corporal Farrell was tasked to carry out a special inspection on the nacelle upper-fire-shield of an Aurora aircraft. During the course of the inspection he noticed an irregular contour on the lower skin surface of the left-hand aileron. Investigation of the flight control surface revealed a four-millimetre crack.

Corporal Benham was tasked to carry out the repair to the aileron. When the damaged skin was removed severe intergranular corrosion was discovered. Knowing that a large portion of the aileron skin is spot-welded, and that further corrosion could be indicated by weld separation, Corporal Benham decided to investigate further. He detected another inconsistency in the surface approximately two feet outboard of the original repair area. Examination of the area revealed corrosion that was deemed beyond unit repair capability.

Master Corporal Farrell demonstrated superior professionalism and powers of observation by detecting a subtle irregularity in an area not related to the course of the inspection he was performing. Corporal Benham's initiative and professional knowledge lead to the discovery of the true extent of damage to a flight-control surface. Their combined efforts resulted in the elimination of a significant safety hazard. *Well done.* ◆



Master Corporal Max Farrell
& Corporal Mark Benham

Sergeant Randy White,
Master Corporal Arnie Dauphinee
& Master Corporal Art Amey

During maintenance of the Tow Target System wiring bundle on a Silver Star aircraft, Master Corporal Dauphinee noted that the flexible oxygen line leading to the rear regulator was rubbing against the rudder pedal walking-beam. The aircraft had undergone significant modifications thirty flying hours prior to Master Corporal Dauphinee's discovery. Although the line was undamaged it had scored a deep groove into the beam.

Upon hearing of the problem, Sergeant White and Master Corporal Amey decided to scrutinize another Silver Star that was undergoing acceptance checks. Their examination revealed that the aircraft was in a similar condition to the previous one. An immediate fleet wide special inspection was quickly initiated. The subsequent investigation revealed that some aircraft had had incorrect fittings installed on the new narrow panel oxygen regulators. The use of these fittings had resulted in the oxygen line to the rear cockpit being improperly routed.

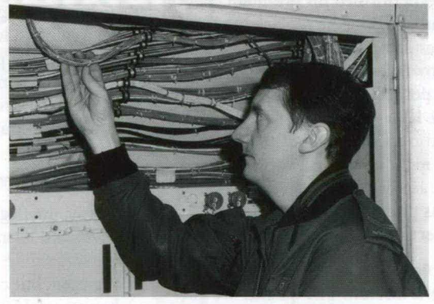
Master Corporal Dauphinee, Sergeant White, and Master Corporal Amey demonstrated superior initiative and professionalism. Their efforts resulted in the detection and elimination of a significant safety hazard. *Well done.* ◆

Corporal Claude Dion

Corporal Dion was performing an after-flight check on an Aurora aircraft when he noticed unusual markings on the top of the crypto-security-unit chassis. He investigated further and discovered that a wire harness was chafed and that arcing had occurred causing the formation of a small hole along the top edge of the unit. Corporal Dion immediately notified his supervisor and a flight safety report was generated.

Concerned that the chafing problem could be systemic, Corporal Dion carried out further inspections of other Aurora aircraft. His examination revealed other cases where the harness was in a position to cause similar arcing. A local survey was ordered and all remaining Aurora aircraft were inspected.

The inspection Corporal Dion was tasked to complete required only a general examination of the area where he found the fault. His strict attention to detail and superior initiative allowed him to identify and eliminate a significant flight safety hazard. *Well done.* ◆



I Learned About Flying *From That*

It was day two of a three-day long-range trainer as part of my Twin Otter operational training. Long range trainer is a bit of a misnomer in the Twin Otter world, as it took us a whole day to make it to Calgary from Yellowknife. All airspeed jokes aside, myself and the other pilot in training were getting comfortable with the aircraft and were starting to have some fun now, applying what we learned to enroute operations.

The first leg of the day we planned to go IFR to Cold Lake and stay the night. The weather was not terrible, but there were local snow showers and broken cloud based at 3000 feet. While we flight planned, the flight engineer went outside and performed his pre-flight checks. Once he was done he replaced the pitot covers and engine inlet covers, as heavy, wet snowflakes were starting to fall. At this point it is important to mention that the large red "remove before flight" flag had ripped off one of the pitot covers the night before. All that remained was the leather cover, and it was this that was placed over the pitot tube to protect it from the falling snow.

Flight planning finished, we hurried out to the aircraft. The quicker we got going, less were the chances of us having to spend time de-icing. The covers were removed, engines started, clearance received, and off we taxied.

Takeoff procedure in the Twin Otter calls for a 60-knot airspeed check to confirm that both airspeed indicators are working properly. When the aircraft commander called "60 knots" off his airspeed indicator, I glanced down at my airspeed to see it flickering right around the zero mark. Because of the Twin Otters short takeoff ability, our lightweight, and my momentary hesitation, we were airborne. The aircraft commander in the right seat confirmed that his airspeed was working and that the aircraft felt normal then took control. There was still several thousand feet of runway remaining, but a rushed, overweight landing is not always the best idea. We elected to remain VFR and returned for the visual approach. While airborne we analyzed the problem and on a hunch I looked out my window — there was the pitot cover snugly in place on the left-hand pitot tube! The pitot heat circuit breaker was pulled and we landed without further incident.

What went wrong? Many things:

Firstly, the flag attached to the pitot cover had been gradually coming apart for some time. It was meant to be replaced, but came apart before that happened. Unfortunately, we didn't pay particular attention to it on the trip.

Secondly, four aircrew walked out to the plane, and not a single one noticed the pitot cover was still in place. Scanning an aircraft during the last-chance check may work sometimes, but if you are not expecting to see something wrong, chances are you won't. Visually confirm each item in your check.

Thirdly, speak up! When I noticed the lack of airspeed, I should have called it out immediately. An abort may turn out to be unnecessary, but it is far less embarrassing then running off a runway, or worse.

The incident was well handled by the aircraft commander and was a good lesson for me. The most important thing to do is relax. Don't run through red pages too fast for your crew to follow through. When an incident occurs, follow the old adage: aviate, navigate, and communicate — fly the aircraft first. Make sure that there is always someone looking outside. Have someone concentrate on the flying — and only the flying — while the rest of the crew concentrates on the emergency. Calgary is a busy airport and the weather wasn't perfect, but when you prioritize your actions things go a lot smoother — as did the rest of our long-range trainer

– Lieutenant Crouch. ◆

ment

Logic

re the hazards
s operation?

How severe will the ccident be?

What is the exposure to that accident?

What is the vel of risk?

s that risk