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Learjet MEDEVAC Flight Ends in Controlled-flight-into-terrain (CFIT) Accident

The Canadian accident-investigation board determined that the flight crew had apparently mis-set one or both altimeters, resulting in lower-than-prescribed altitudes for the descent profile. The flight crew and medical-team passengers were killed when the Learjet was unknowingly flown into the water.

FSF Editorial Staff

The twin-turbofan Learjet 35 was on a night medical evacuation (MEDEVAC) flight when it disappeared from radar while executing a nondirectional beacon (NDB) approach to a remote Canadian airport. Search-and-rescue aircraft were dispatched shortly after the Learjet was declared missing. Aircraft wreckage and the bodies of two occupants were found floating in the Pacific Ocean two days later near its last known position.

The Transportation Safety Board of Canada (TSB), in its final accident investigation report, said that the cause of the accident was that the "crew most likely conducted the instrument approach with reference to an unintentionally mis-set altimeter ... and unknowingly flew the aircraft into the water. The circumstances leading to the incorrect altimeter setting could not be determined, nor was it determined why the crew did not detect the mis-set altimeter."

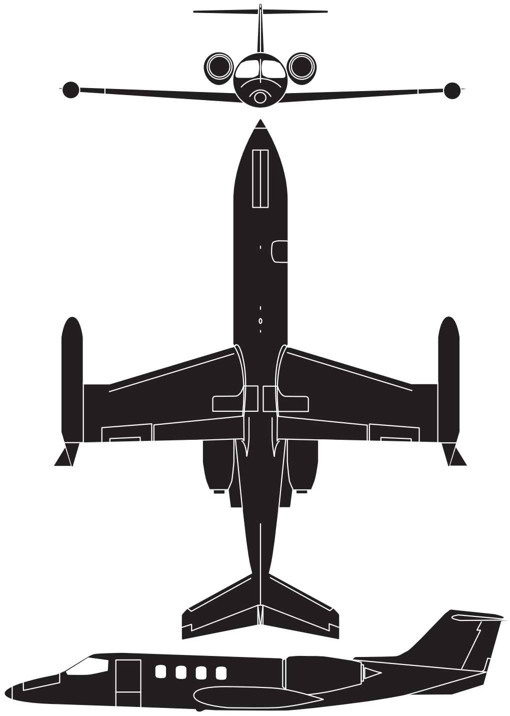
Two flight crew members and a three-member medical team were killed in the Jan. 11, 1995, accident. The aircraft was located in 79 meters (260 feet) of water about 8.8 nautical miles (16.3 kilometers) from the threshold of Runway 12 at Masset Airport, located at the northern end of the Queen Charlotte Islands. The bodies of three aircraft occupants were not recovered, the report said.

The MEDEVAC flight, operated by Canada Jet Charters Ltd., departed Vancouver International Airport, British Columbia, at 0035 local time under instrument flight rules (IFR) to Masset Airport. The mission was to transport a patient from Masset to nearby Prince Rupert on the mainland for treatment. Then the aircraft was to return to Vancouver.

The route was from Vancouver direct to the Sandspit very high frequency omnidirectional radio range (VOR) at an altitude of 39,000 feet (11,895 meters), then 48 nautical miles (89 kilometers) direct to the Masset NDB. At 0144, the flight crew reported to air traffic services (ATS) that they were "outbound" from the Masset NDB on the published NDB "A" instrument approach to Runway 12 (Figure 1, page 3).

"Air traffic control (ATC) radar, situated near the Sandspit VOR, tracked the aircraft as it flew the approach," the TSB report said. "Radar data shows that the aircraft began a descent about 10 seconds after it had completed the procedure turn and was established on the final inbound approach track. Forty-three seconds later ... the aircraft disappeared from radar."

The report said that Vancouver area control center (ACC) recorded radar data showed that the aircraft "followed the required track during the transition from Sandspit [VOR] to Masset [NDB] and during the instrument approach procedure to the point where radar contact was lost. FDR [flight data recorder] and radar data both reveal that the aircraft was holding definite altitudes. This demonstration of positive



Learjet 35

The Learjet 35 is powered by two AlliedSignal TFE731-2-2B turbofan engines. The 35 can accommodate eight passengers and two flight crew members. It has a maximum takeoff weight of 18,300 pounds (8,300 kilograms); a maximum cruising speed at 41,000 feet (12,500 meters) of 460 knots (852 kilometers per hour); and a service ceiling of 41,000 feet. With four passengers, maximum fuel and 45-minute reserves, the 35 has a range of 2,196 nautical miles (4,067 kilometers).

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

control indicates that the pilot was flying the approach according to established procedures and that the aircraft and crew were proceeding with the flight without any apparent difficulty. The lack of any emergency radio communication also supports the premise of normal in-flight circumstances."

The first officer acknowledged a Sandspit altimeter setting of 29.17 in. Hg [inches of mercury] just before the aircraft began its descent from 39,000 feet, the report said. "Although it could not be determined if he had adjusted his altimeter at that time, it should have been changed in accordance with normal practices," the report said. "He would likely have not made any further change to his altimeter sub-scale after that time since no more pressure settings were relayed to the crew."

The report added: "The captain was likely flying the aircraft. In this case, if his altimeter was set correctly, there is no apparent reason for him to have maintained consistently low altitudes and flown into the water. It must be concluded that his altimeter was incorrectly set.

"The most likely causal element in the accident, the mis-setting of the altimeter, probably occurred during descent through the transition level at 18,000 feet [5,490 meters] but certainly before the Sandspit transition procedure to [the] Masset [NDB], either by error or omission," the report said.

The captain, 30, held an airline transport pilot (ATP) certificate and had logged a total of 4,550 flying hours, of which 2,550 hours were on type. The first officer, 29, also held an ATP certificate and had logged a total of 2,880 flying hours, of which 61 were on type, the report said.

The captain was hired by Canada Jet Charters in September 1989 as a first officer on Learjet aircraft, the report said. "Until his upgrade to captain on Oct. 31, 1994, he had flown the company's Learjet 25-, 35- and 55-series aircraft as a first officer and had amassed about 2,450 hours on them. Since his upgrade, he had flown about 65 hours as pilot-in-command on the Learjet."

The report added that the captain had flown "many IFR operational and MEDEVAC flights, both day and night, and had flown into Masset [Airport] on several occasions."

The first officer was hired by the company in November 1994, the report said. "The bulk of his flying with the company had been conducted with either the chief pilot or the company training captains. He had been on the line for nearly eight weeks, and had only begun flying with regular line captains on Dec. 22, 1994."

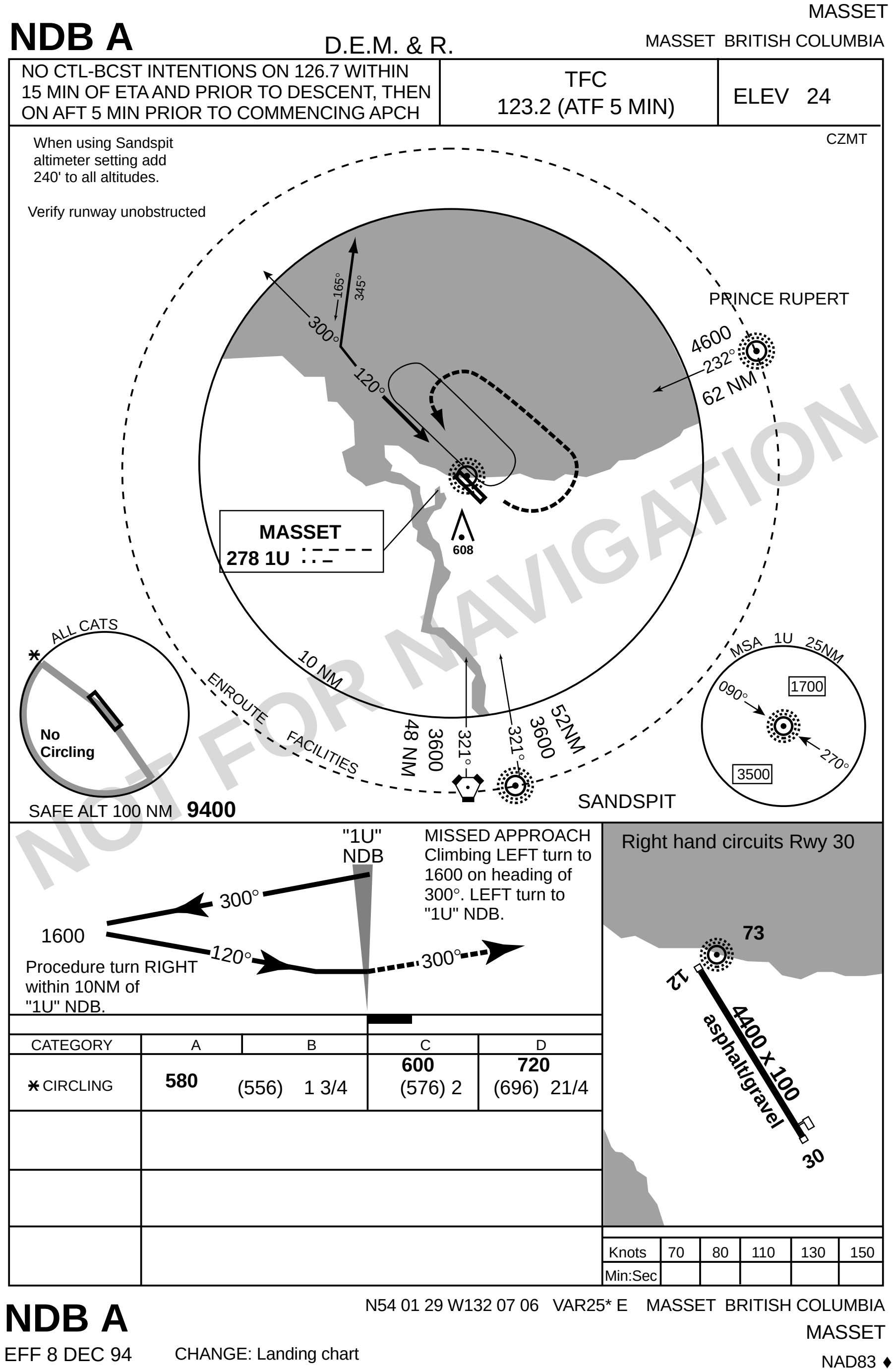
The captain was described as a "conscientious pilot, respected by his peers and supervisors in the company," the report said. The first officer was described as having a "positive, professional attitude" and as a "dedicated individual who was in the early stages of his aviation career."

A week after the accident, aircraft wreckage was pulled up in a fishing trawler's net, the report said. Underwater sonar located wreckage on the bottom on Jan. 31, and the main wreckage was positively identified on Feb. 8 by a video camera mounted on a remotely operated vehicle (ROV). "The wreckage consisted of most of the aircraft except the cockpit and cabin section forward of the wings, which could not be located," the report said.

The report added: "The Learjet had broken apart into several major components: the rear fuselage section and vertical fin, the horizontal stabilizer and elevators, the central wing section, the wing extensions, the tip tanks and the two engines and pylons. A portion of the cockpit central instrument panel containing some engine performance gauges was also found. The landing gear was not found. The only part recovered of the main aircraft wreckage was the rear fuselage and vertical fin section, which contained the flight recorders."

The wreckage was examined using the ROV's video camera, the report said. "The portion of the instrument panel containing

Instrument Approach at Masset, British Columbia, Canada



Source: Adapted from *Aviation Occurrence Report, Controlled Flight Into Water, Canada Jet Charters Limited Learjet 35 C-GPUN Masset, British Columbia 8nm NW 11 January 1995.*

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Figure 1

the engine gauges was examined using the underwater video camera; it was not possible, however, to clearly or accurately read any of the gauges, nor could the underwater vehicle successfully recover the instrument cluster for later examination.

"The panel also contained the 'set altitude' alerter device used by pilots to alert them of the next pertinent altitude; it was found to have a setting of between 800 feet and 900 feet [244 meters and 275 meters]. Such a setting could have been consistent with conventional instrument approach procedures; however, that the

100-foot digits ‘8’ and ‘9’ were both visible in the window, that is, in an abnormal ‘mid-way’ position, indicated that the original setting had been disturbed, presumably during the accident sequence. As a result, the setting on the device at impact could not be determined, nor could it be ascertained if, or when, this crew had entered a setting.”

The “T-handles,” which when pulled close the main fuel shut-off valves and the hydraulic shut-off valve, were found in the stowed position, the report said.

There was no evidence of engine, system or structural malfunctions, the report said. No medical conditions were found that would have affected the performance of the captain and first officer, and they “had been given the opportunity of adequate rest periods before flight, and had not flown, or been on duty, in excess of the limits imposed by regulation.”

FDR information indicated that the flight was “unremarkable” from Vancouver until the aircraft began its descent from 39,000 feet, the report said.

After leaving cruise altitude, the aircraft “descended to an initial altitude of about 3,400 feet [1,037 meters] standard pressure altitude (PA) based on 29.92 in. Hg; based on the actual barometric pressure setting at the time, this altitude was about 2,650 feet [808 meters] ASL [above sea level]. The aircraft then gradually climbed to about 3,650 feet [1,113 meters] PA (2,900 feet [885 meters] ASL). At 0144:20 [local time], the aircraft began a descent to about 1,400 feet [427 meters] PA (650 feet [198 meters] ASL). Twenty-five seconds later, the aircraft climbed to maintain 1,650 feet [503 meters] PA (900 feet [275 meters] ASL) until 0149, when it began a descent to the initial impact point of about 750 feet [229 meters] PA (zero feet ASL). The aircraft struck the water at a recorded speed of 138 knots [255 kilometers per hour] on a heading of 107 degrees.”

The report noted that the FDR records data at an atmospheric pressure of 29.92 in. Hg, but that the pressure at the time of the accident was 29.17, which results in a 750-foot difference in altitude.

“This descent profile, to the point of impact, accurately corresponds to the required transition and instrument approach procedures, the altitudes flown do not,” the report said. “Concomitant with this descent profile were headings, airspeeds and intervals nearly identical to those required by the approach. At no time did the FDR data indicate that the aircraft deviated from the flight-planned route or that the crew was experiencing any difficulty in flying the approach.”

The accident aircraft was equipped with a cockpit voice recorder (CVR), but it was not operating. “The tape cartridge in this unit was found jammed; a review of the tape contents revealed that the unit had last functioned 12 days before the accident. As a result, no information regarding the accident flight was available to the investigation. It is highly likely that the last 30 minutes of the crew’s communications would have yielded valuable information concerning the circumstances leading … to the accident. Such information could have led to determining, for example, the reasons why the crew did not set the correct altimeter settings and why they did not detect their low altitudes.”

A CVR-performance check was scheduled to be conducted with the 150-hour and 300-hour engine inspections, the report said. “The last engine inspection was performed on Jan. 4, 1994, but the CVR test was inadvertently omitted; the unit had jammed four days earlier.”

Masset Airport, located on the northeastern corner of Graham Island, is a public-use airport operated by the village of Masset. Its only runway, 12/30, is 1,342 meters (4,400 feet) long and 23 meters (75 feet) wide. The runway was lighted for a Runway 12 arrival at the time of the accident, the report said.

There was no weather-reporting facility at Masset Airport, the report said. An automated weather observation system (AWOS) located at Sandspit, 48 nautical miles south of Masset, provided ongoing weather observations. Two other nearby AWOS stations, which did not transmit ceiling, visibility or altimeter setting, were also operating at the time of the accident. Both of those stations did report mean sea level pressure and temperatures, the report said. [Mean sea level pressure is reported to the nearest 0.1 millibar (mb), and the altimeter setting is reported to the nearest 0.01 inches of mercury (in. Hg)].

Weather at Sandspit at 0136 was reported as 31 meters (100 feet) scattered, estimated ceiling 580 meters (1,900 feet) overcast, visibility 6.4 kilometers (four miles) in heavy rain, temperature and dew point 6 degrees C (43 degrees F), wind from 120 degrees at 16 knots (30 kilometers per hour), altimeter setting 29.17.

The Masset Airport manager told accident investigators that weather at the time the aircraft was declared missing was “not adverse.” The report said that the manager informed the pilot by telephone at 2330 that the “wind was from the southeast at about five knots [9.3 kilometers per hour], with light rain, and the visibility was such that he could clearly see the lights on the [178-meter (585-foot) high] NDB tower. When the aircraft called while over the beacon outbound, the wind and visibility had remained unchanged, and the light rain had reduced in intensity. No local altimeter setting was requested by, or given to, the pilot. The actual in-flight weather conditions offshore were not known.”

Weather was not a causal factor in the accident, the report concluded.

The TSB said that an aircraft conducting the Sandspit transition to the Masset NDB “A” nonprecision approach to Runway 12 (Table 1, page 5) “would initially cross the Masset NDB at an

Table 1
Altitude Variances Based on Altimeter Settings in Learjet-35 Accident, Masset, British Columbia, Canada, Jan. 11, 1995

Procedure	Canadian Air Pilot Altitude Required (feet)	Remote Setting Altitude Required (feet)	Flight Data Recorder Altitude Data (feet)	Altitude Difference (feet)
Transition	3,600	3,840	2,900	700/940
Procedure Turn	1,600	1,840	900	700/940
Minimum Descent Altitude	600	840	0*	600/840

* Impact
Note: See text for metric conversions.
Source: Transportation Safety Board of Canada

altitude of 3,600 feet [1,098 meters] ASL and proceed outbound on a track of 300 degrees magnetic. It would then enter the procedure turn and maintain 1,600 feet [488 meters] ASL, before descending on the final inbound track to the minimum descent altitude (MDA) of 600 feet [183 meters] for Category 'C' aircraft; the Learjet was a Category 'C' aircraft. In accordance with the remote altimeter setting procedures, 240 feet [73 meters] must be added to these altitudes as minima."

The accident aircraft was required to be equipped with a radio altimeter (radalt), the report said.

"The aircraft was fitted with a radalt with direct scale reading of altitude from 0 [feet] to 2,500 feet [763 meters], and incorporated a manual altitude setting knob and 'bug,' with an associated warning light. There were two repeater lights on each end of the central warning light panel, and all lights would have been illuminated whenever the radalt indicated an altitude less than the bug value set by the pilot. The bug can be set below zero on the instrument, thereby disabling the warning light; some pilots find the warning light distracting, particularly at night, when flying at set minima."

The report said "normal practice in the company was to set and maintain the radalt bug to below zero while the aircraft was en route. The MDA or the decision height (DH) for the approach was normally set on the radalt during descent from cruise altitude, or on passing the transition level at 18,000 feet."

The radalt was not found in the wreckage, the report said. An analysis concluded that the altitude-warning lights "were not illuminated when they were subjected to accident impact forces; whether the lights were on immediately before impact could not be determined," the report said.

The accident aircraft was also equipped with two altimeters, one on each side of the instrument panel, the report said. "The left-side (captain's) instrument consisted of a Mode 'C' encoding altimeter, an altitude alerter and a static-defect correction module," the report said. "The pilot used and set the altimeter in the same way as a conventional barometric altimeter. The altimeter face scale was graduated in 20-foot [6.1-meter] increments from 0 to 1,000. The single pointer made one complete revolution for each 1,000 feet [305 meters] of altitude. At the center of the instrument face was a horizontal counter which read in hundreds and thousands of feet. Above and below the counter were the two altimeter sub-scale windows, graduated in both inches of mercury and millibars."

The altitude alerter compares the altitude selected in the "set altitude" device on the instrument panel to the indicated altitude, the report said. "As the aircraft approaches [1,000] feet [305 meters] of a preset altitude, an altitude alert light and a momentary audio signal (chime) are activated. The light remains on until the aircraft is within 300 feet [92 meters] of the preset altitude. The chime will sound and the light will illuminate whenever the altitude deviates 300 feet from the preset value. Normally, company first officers set the alerter to either the MDA or the DH when extending the landing gear and flaps as the aircraft intercepts the final inbound leg of the approach."

The first officer's altimeter, on the right side, was a conventional barometric altimeter with an altitude presentation identical to the captain's altimeter but without an altitude-alerting device or static-correction system, the report said. "This would cause the right-side altimeter to read differently from the left-side altimeter. There is an acceptable differential published in the aircraft flight manual."

The report added: "By design, the differential decreases upon descent, and at lower altitudes it diminishes to zero where the altimeters would indicate identical altitudes when set to a common sub-scale setting. The FDR data for this accident flight indicated that this altimeter differential became negligible below 4,000 feet [1,220 meters] pressure altitude."

Based on its investigation, the TSB concluded that there were "three possible explanations, none of which can be refuted with certainty, as to why the aircraft flew the whole approach with a consistent altitude error."

The scenarios were based on phases of descent where "hard" altitudes were required, including the Sandspit transition altitude of 3,600 feet; the procedure turn altitude of 1,600 feet; the MDA of 600 feet; the remote altimeter setting MDA of 840 feet [256 meters]; the Sandspit remote altimeter setting transition at 3,840 feet [1,171 meters] and the remote altimeter setting procedure turn altitude of 1,840 feet [561 meters].

The least plausible scenario involved an approach being flown with an altimeter setting of 29.17, which would have indicated the aircraft's true height above the water, the report said.

"The pilot received this altimeter setting during his preflight weather check, and it was also relayed to him by ATC," the report said. "Available information shows that the aircraft flew at specific, controlled and consistently low altitudes during the complete instrument approach at Masset, and if 29.17 in. Hg was set, the aircraft would have been flown in the final descent until the altimeter read zero. Consistently flying low and descending until the altimeter reads zero are not the actions of professional pilots. It can be concluded, therefore, that the aircraft was not being flown with reference to an altimeter set to 29.17 in. Hg."

A second scenario assumed that the approach was flown with the altimeter set to the standard pressure of 29.92 in. Hg, the report said.

The report said that "several other abnormal factors" would have had to occur to make this theory plausible, including the captain not resetting his altimeter on descent through 18,000 feet.

"The captain had flown high-performance Learjet aircraft for the last five years and would have changed altimeters at the transition level at least twice on most flights," the report said. "Furthermore, professional pilots in high-performance aircraft are constantly attuned to the meteorological conditions at destination [airports], and verifying and changing an altimeter setting is a standard practice. With such long-ingrained habits, it is most unlikely that he would not have reset his altimeter. [In addition], the first officer would have had to miss this changeover. A significant distraction, however, could have caused them both to overlook the sub-scale change."

The report noted that this scenario does not address the remote altimeter setting requirement and that a pilot of the captain's "standard would likely not have ignored this additional altitude requirement. ...

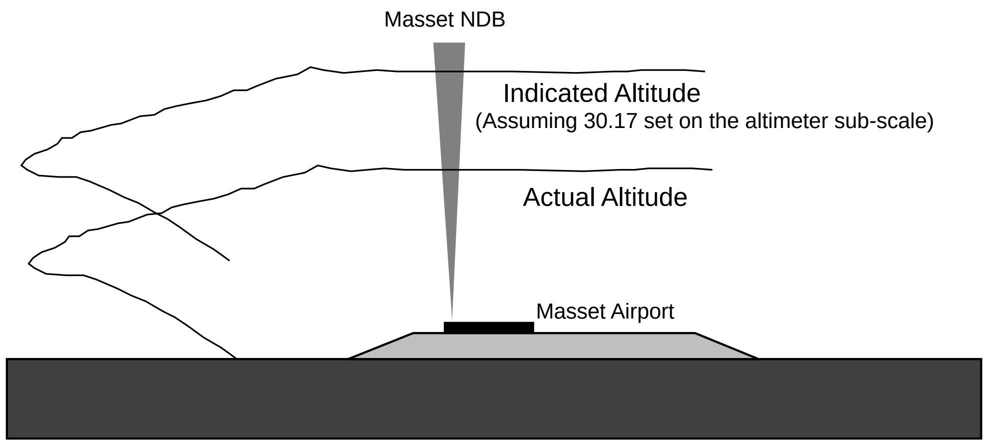
"Finally, at the low altitudes where the two altimeters should have been consistent with each other, an altitude discrepancy of 750 feet [229 meters] would have been visually obvious during scans or cross-checks, since the angular difference of the pointers would have been 90 degrees on the instrument faces [assuming the first officer had changed his altimeter and the captain had not]," the report said.

The third scenario assumed that the approach was flown with the altimeter incorrectly set at 30.17 in. Hg, but in compliance with the remote altimeter requirement of 240 feet (Figure 2).

"The initial level-off for the Sandspit transition was at an indicated altitude of 3,650 feet, after which the aircraft maintained an indicated altitude of about 3,850 feet [1,174 meters]," the report said. "This last altitude nearly corresponds to the 3,840-foot remote transition altitude required. The profile is consistent with the pilot erroneously leveling off at the 3,600-foot minimum before recalling his obligation to add 240 feet because of the remote altimeter requirements.

"The subsequent procedure turn level-off at an indicated altitude of 1,650 feet, followed by a quick climb to an indicated altitude of 1,900 feet, was also consistent with the pilot

Comparision of Indicated and Actual Altitudes in Learjet-35 Accident Masset, British Columbia, Canada, Jan. 11, 1995



Source: Transportation Safety Board of Canada

Figure 2

descending to the original approach plate–profile minimum, before quickly climbing back up to the 1,840 feet required. The inbound descent would have progressed until water contact at an indicated altitude of about 1,000 feet."

The report said that because of the "simple adjustment mechanism on the altimeter itself, it is physically easier and quicker to turn the altimeter adjustment knob to arrive at a figure of 30.17 from an existing value of 29.92, than it is to turn to 29.17. It has been shown that pilots can become accustomed to [concentrating on] the decimal part of the altimeter setting and pay less attention to the whole number. It is possible that the pilot turned the altimeter-setting knob in the shortest direction to 30.17, did not recognize his error and mistakenly thought he had set 29.17."

The report concluded: "The scenario that best fits the available information is that the crew mistakenly set 30.17 on the sub-scale of their altimeters. Why neither crew member detected the error could not be determined."

TSB investigators also examined the charter company's operations. The report said that Transport Canada (TC) operational audits had found that the company was "maintaining a satisfactory standard in accordance with appropriate sections of the regulations."

But the report added that the company had no written standard operating procedures (SOPs) for its aircraft, nor did TC require them. "TC recommends that companies have SOPs because they greatly improve crew coordination and overall operational safety. ... During interviews with company pilots, it was determined that there was variation in the conduct of flight procedures [among] captains. Every six months, during ongoing flying training, the company training captains reviewed and identified standard flight procedures, but there was no formal standardization training."

The report said that without SOPs, normal company procedures for an approach would have included an "approach briefing, descent checks, landing checks and altitude calls. ...

"During the descent, the PF [pilot flying] would call for the descent checks, and the checklist would be completed by the challenge-and-response method. The item 'altimeter setting' was in the descent check. The company procedure required that the destination altimeter setting be set on the right-hand side altimeter, even though the aircraft might be well above 18,000 feet.

"As the aircraft descended out of 18,000 feet ... the PF would call for the transition checklist and both pilots would acknowledge the altimeter setting. Throughout the approach, the PNF [pilot not flying] would call out any pertinent altitudes and any significant deviations from the approach profile. The standard altitude calls were 1,000 feet above minima, 100 feet above minima and minima."

The report also noted that the company had no formal crew resource management (CRM) program for pilots, although TC safety personnel had presented pilot decision-making training courses to company pilots. The captain attended both courses, the report said. The first officer had not yet been hired by the company when the courses were offered.

Given the weather and lighting conditions during the night approach, the report concluded that there would have been "few visual cues to help the crew establish their altitude. Any peripheral lighting would probably have been of no benefit to the crew in being alerted to their low altitude. [In addition], at

The Flight Safety Foundation CFIT Accident-reduction Campaign

Flight Safety Foundation (FSF) is engaged in an international campaign to drastically reduce the number of controlled-flight-into-terrain (CFIT) accidents. The guiding force in this work has been the FSF CFIT Task Force, which set a goal of reducing the CFIT accident rate by 50 percent by 1998.

As part of the overall plan for CFIT-accident reduction, the task force has made eight recommendations to the International Civil Aviation Organization (ICAO), one of which has already been adopted, with the others under consideration. ICAO adopted a recommendation to broaden requirements for the use of ground-proximity warning systems (GPWS). The new standard, effective Dec. 31, 1998, requires GPWS in all aircraft used in "international commercial and general aviation operations, where the MCTM (maximum certified takeoff mass) is in excess of 5,700 kilograms (12,500 pounds) ... or that are authorized to carry more than nine passengers." Pending recommendations include a call for color-shaded depictions of terrain altitude on instrument approach charts; a warning against the use of three-pointer and drum-pointer altimeters; a recommendation that all countries adopt the use of hectopascals for altimeter settings; and a call for the use of automated altitude callouts.

Products developed by the FSF CFIT Task Force include the FSF CFIT Checklist, which helps pilots assess CFIT risk for specific flights; an educational video, *CFIT Awareness and Prevention*; and the *CFIT Education and Training Aid*, a two-volume training aid produced in cooperation with the Boeing Commercial Airplane Group. The Boeing-produced training aid, which includes the video *Controlled Flight into Terrain: An Encounter Avoided*, examines a number of CFIT accidents and focuses on human factors and management issues. The Boeing-produced training packages are currently being distributed by airframe manufacturers to their customers. After the initial distribution, copies will be available from the Foundation at a cost of about US$100. Copies can be ordered in advance by contacting Ellen Plaugher, telephone (703) 739-6700, extension 101, or fax (703) 739-6708.

The FSF CFIT Checklist is available from the Foundation free of charge, and FSF's *CFIT Awareness and Prevention* is available from the Foundation for $30.♦

this particular phase of the approach, both pilots would likely have been concentrating upon their respective duties inside the cockpit and might not have had the opportunity to look outside.

"[Because] the mis-set altimeter was indicating altitudes [that] the captain had planned and had expected to see, he would have been unaware of the actual low altitude over the water, except if he had observed the radio altimeter. Had the crew set the radalt bug to below zero to prevent the warning light distracting them, the only indication of low altitude would have been the reading of the instrument itself. As the crew continued to perform their normal approach-and-landing activities, they may have been distracted from their task of monitoring the radalt."

The report said that the accident was typical of a controlled-flight-into-terrain (CFIT) accident, which involves an aircraft, under the control of the crew, being flown into terrain or water with no prior awareness of the impending accident.

The accident was not equipped with a ground-proximity warning system (GPWS), the report said, adding that it was not required to have one. "GPWS has prevented many accidents where, until the warning was given, the pilots had been unaware that the aircraft was in danger because of its proximity to ground or water."

The TSB investigation determined that the accident aircraft had been equipped with a GPWS in the past and noted its concern that "safety equipment is being removed from aircraft because it is not required by regulation."

The report said that during an 11-year period from Jan. 1, 1984, to Dec. 31, 1994, "70 commercially operated aircraft not conducting low-level special operations were involved in CFIT accidents in Canada."

A training package, "Preventing CFIT," has been produced and distributed by Transport Canada, the report said. The TSB also cited international CFIT prevention initiatives and CFIT avoidance products developed by a Flight Safety Foundation–led CFIT Task Force in counsel with the International Civil Aviation Organization (ICAO).

The report noted that there have been "numerous documented cases concerning pilots applying incorrect altimeter settings in situations of unusually low barometric pressure. A common thread in most of these occurrences is that each pilot had entered a sub-scale setting [that] was 1 in. Hg in error, that is, the altimeter was misreading by 1,000 feet. ... In Canadian domestic airspace, barometric settings in the low 29 in. Hg pressure region are infrequent. As a result, pilots can develop the habit of concentrating upon only the decimal part of the setting.

"Ultimately, it is the flight crew's responsibility to ensure that the correct altimeter setting is applied, and to maintain good cockpit communication to catch any errors."♦

Editorial note: This article was adapted from *Controlled Flight into Water/Canada Jet Charter Limited Learjet 35 C-GPUN Masset, British Columbia 8 NM NW 11 January 1995*, Report no. A95P0004, prepared by the Transportation Safety Board of Canada. The 49-page report contains figures and appendices.

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