

The pilots of the Learjet air ambulance likely were affected by fatigue during the VFR departure; a controller failed to relay radar altitude warnings.

BY MARK LACAGNINA



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CEIT

on a dark night departure

About 0025 local time, two minutes after departing from San Diego to return home on the fourth leg of an air-ambulance operation that had begun the previous afternoon, a Learjet 35A struck a mountain, killing all five occupants. The flight crew's attempts to obtain an instrument flight rules (IFR) clearance before takeoff had been unsuccessful, so they had departed under visual flight rules (VFR). They were flying the Learjet about 100 ft below the clouds and communicating with air traffic control (ATC) when the accident occurred on Oct. 24, 2004.

In its final report, the U.S. National Transportation Safety Board (NTSB) said that the probable causes of the accident were "the failure of the flight crew to maintain terrain clearance during a VFR departure, which resulted in controlled flight into terrain, and the air traffic controller's

issuance of a clearance that transferred the responsibility for terrain clearance from the flight crew to the controller, failure to provide terrain clearance instructions to the flight crew and failure to advise the flight crew of MSAW [minimum safe altitude warning] alerts."

A contributing factor was "the pilots' fatigue, which likely contributed to their degraded decision making," the report said.

The first leg of the trip was a repositioning flight, with two medical crewmembers aboard, from the operator's home base in Albuquerque, New Mexico, to pick up another medical crewmember in El Paso, Texas.¹ The airplane departed from Albuquerque about 1520 San Diego time (1620 Albuquerque time). From El Paso, the airplane was flown to Manzanillo, Mexico, to pick up a medical patient and an accompanying passenger. The airplane then was

flown to Brown Field Municipal Airport, 13 nm (24 km) southeast of San Diego. The flight crew conducted a visual approach and landed at Brown Field about 2324.

The captain, 56, had 13,000 flight hours, including 525 flight hours in type and 639 flight hours in Learjet 25s. His wife told investigators that he had conducted at least one previous flight to San Diego, in January 2003. The copilot, 30, had 3,000 flight hours, including about 60 flight hours in type and 100 flight hours in Learjet 25s. There was no record that he had ever flown to San Diego.

Fatigue Factor

Reconstruction of the 72 hours preceding the accident showed that the captain and copilot were on duty 10 hours and flew more than seven hours on Oct. 21. Because of a generator problem, they spent that night in Battle Creek, Michigan, while the problem was fixed.

On Oct. 22, they flew the airplane back to Albuquerque, logging 3.3 flight hours during 4.3 hours of duty. The captain went to bed about

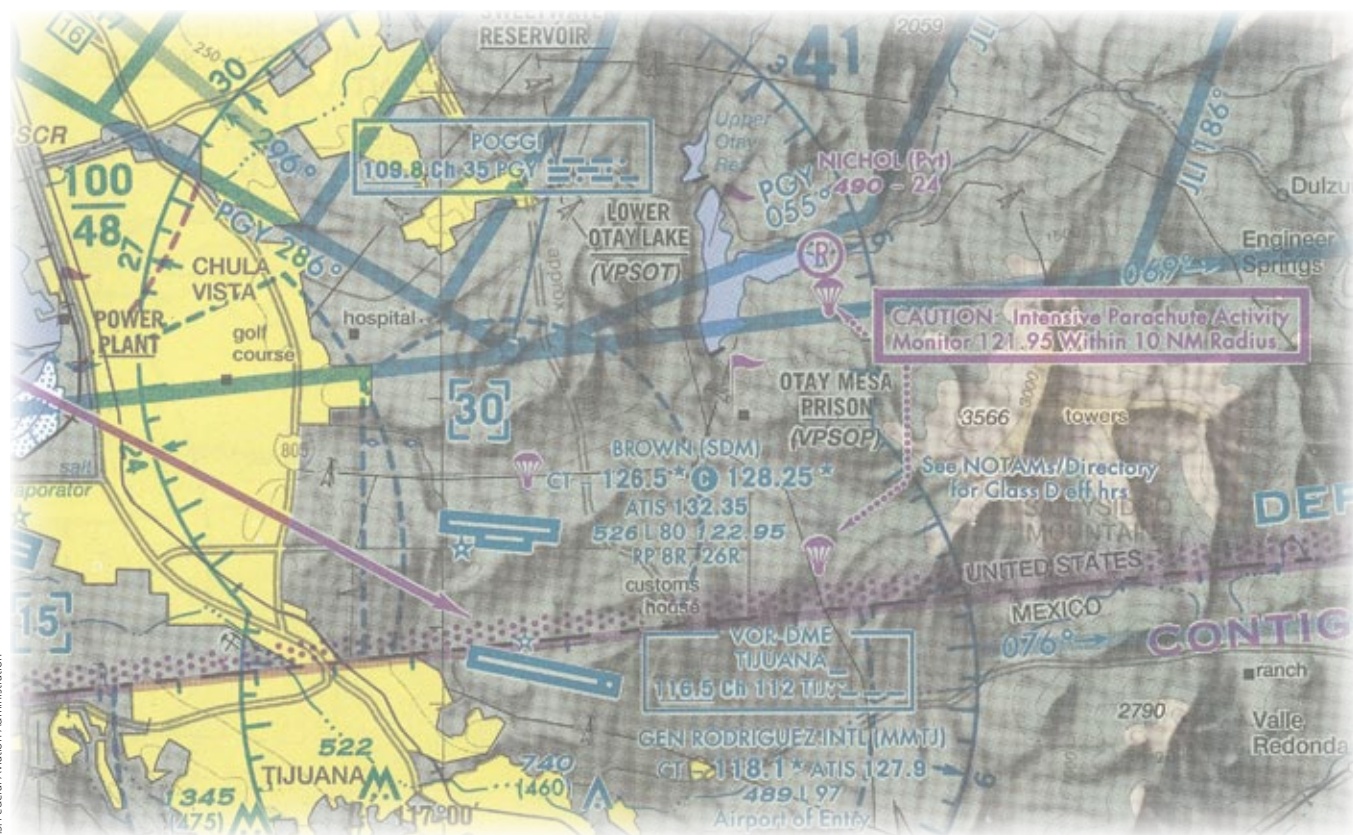
2130 and arose about 0700 on Oct. 23. The copilot went to bed about 2130 and arose about 0830. They received calls assigning them to the air-ambulance trip early that afternoon.

“At the time of the accident, the captain had been awake about 17.5 hours, the copilot had been awake about 16 hours, and both pilots had accumulated about 11 hours of duty time,” the report said. “Although the duty and rest times of both flight crewmembers were in compliance with [regulations], the accident flight departed about three hours past both crewmembers’ normal bedtimes at the end of a long duty day. ... It is likely that physiological and psychological fatigue adversely affected the ability of both pilots to properly plan the departure and assess the risks associated with it.”

No Reply

Soon after midnight on Oct. 24, one of the pilots telephoned the San Diego Flight Service Station (FSS) and filed an IFR flight plan, estimating a 0020 departure. The route of flight was direct to

“Fatigue adversely affected the ability of both pilots to properly plan the departure.”



Palm Springs, California, about 75 nm (139 km) northeast of Brown Field, and direct to Albuquerque, with Flight Level 370 (approximately 37,000 ft) requested for cruise. The pilot did not ask the FSS specialist for weather information or an IFR clearance with a clearance void time.

Before starting the Learjet's engines, the flight crew listened to a portion of the automatic terminal information service (ATIS) broadcast. The report said that cockpit voice recorder (CVR) data indicated that the pilots "listened only to the remarks portion of the [ATIS] recording and did not listen to the weather information," which is obtained from the airport's automated surface observing system (ASOS).

The ASOS report included an overcast ceiling at 2,100 ft, 8.0 mi (12.9 km) visibility, temperature 14 degrees C (57 degrees F), dew point 12 degrees C (54 degrees F), calm surface winds and an altimeter setting of 29.92 in Hg.

The control tower at Brown Field was closed. In an attempt to obtain an IFR clearance before departure, the copilot tried to establish radio communication with the airport's clearance delivery facility, the San Diego FSS on two different frequencies and the nearby Tijuana, Mexico, airport control tower.

"After the copilot's fourth failed attempt to obtain the IFR clearance using the radio, the captain said, 'All right, let's just do VFR,'" the report said. "According to the operator, the flight crew had a cellular telephone and a satellite telephone aboard the airplane. The CVR recording revealed no attempt by either crewmember to telephone the FSS for an IFR clearance and clearance void time."

'Go Straight Out'

The flight crew decided that a departure from Runway 08L would take them away from the city of San Diego and place them on a heading almost direct to Albuquerque. The captain said, "Depart on runway eight. Just go straight out." The copilot, the pilot flying, said, "That sounds real good to me."

The report said that the flight crew did not discuss the mountainous terrain east and

Learjet 35A



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The Learjet 35, introduced in 1974, is similar to the Learjet 25 but has turboprop engines rather than turbojet engines, a longer fuselage and longer wings. The Learjet 35A, introduced in 1976, has wing modifications designed to reduce stall speeds and approach speeds, and improve takeoff performance. Maximum takeoff weight was increased to 18,300 lb (8,301 kg) from 17,000 lb (7,711 kg).

The airplane has accommodations for two pilots and eight passengers. The pressurization system can maintain a cabin altitude of 6,500 ft at maximum operating altitude, 45,000 ft.

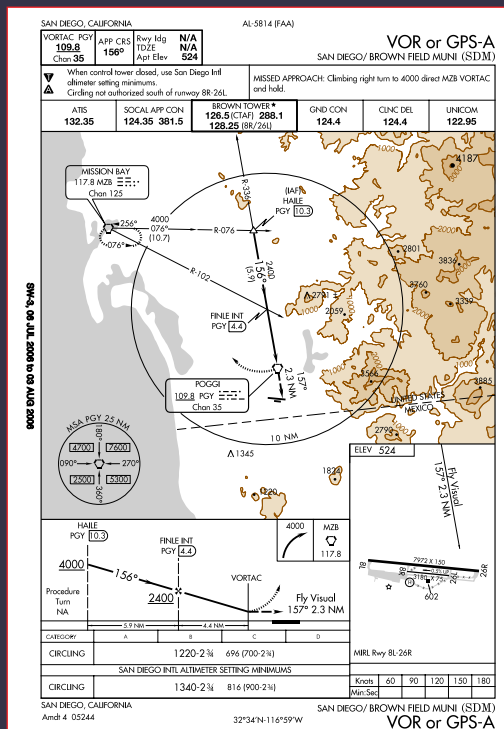
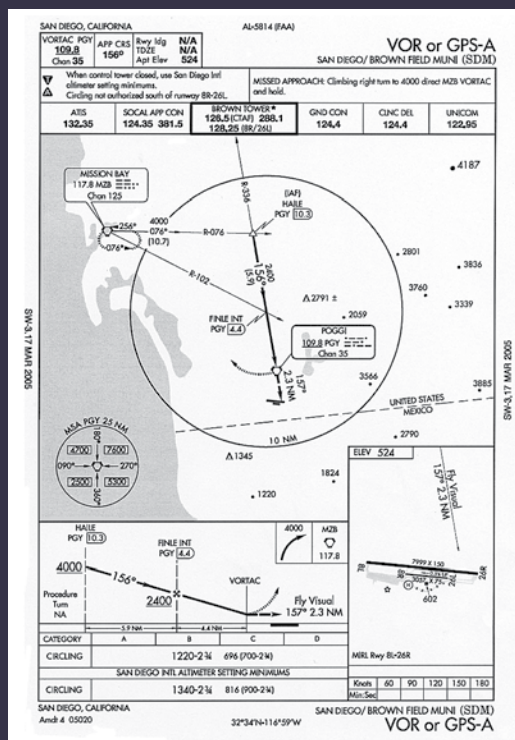
The Honeywell (formerly Garrett and AlliedSignal) TFE731-2-2B engines are rated at 3,500 lb (1,588 kg) thrust. Usable fuel capacity is 6,198 lb (2,811 kg). Maximum rate of climb at sea level is 4,760 fpm. Maximum single-engine rate of climb at sea level is 1,470 fpm. Maximum operating Mach number is 0.81. Maximum range with four passengers and a 45-minute fuel reserve is 2,196 nm (4,067 km). Maximum landing weight is 15,300 lb (6,940 kg).

Production of the Learjet 35A ended in 1994.

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

northeast of the airport, and they did not follow the published obstacle departure procedure for Runway 08L. The procedure requires almost a complete course reversal, with an initial climbing left turn to 3,900 ft on a heading of 280 degrees.

While conducting a pre-departure checklist, the pilots set their altimeters to 29.93 in Hg. The captain's departure briefing was: "Will be standard callouts tonight, and if you can't punch up through a nice hole then just, you know, stay at a reasonably safe altitude and underneath two



Colored terrain
contours were added
to charts after the
accident.

hundred and fifty knots, and I'll do the best I can to get somebody's attention."

The airplane was climbing through 1,800 ft after takeoff when the captain established radio communication with SOCAL (Southern California) Approach Control. "Off Brown Field at this time, squawking VFR, the IFR please to Albuquerque," he said.

The controller assigned a transponder code and asked the captain to "ident" — that is, to select the transponder's identification mode. The controller then told the captain that the airplane was in radar contact. "Fly heading of zero two zero [and] maintain VFR," the controller said. "As soon as you get above five thousand, I'll have an IFR clearance for you."

The controller was employed by the U.S. Federal Aviation Administration (FAA) in 1987. He worked at SOCAL Approach in 1994 and 1995, and at the Brown Field and San Diego International Airport control towers before returning to SOCAL in 1998.

The controller had worked a shift from 0630 to 1430 on Oct. 23 and returned at 2300 to work the midnight shift from 0000 to 0830. "The

controller stated that he rested but did not sleep before reporting for the midnight shift and that he was not tired when he handled the accident flight," the report said.

The captain's acknowledgement of the controller's instructions was the last recorded radio transmission from the Learjet. Recorded ATC radar data indicated that the airplane was in level flight at 2,300 ft and 3.5 nm (6.5 km) west of mountainous terrain that rises to 3,566 ft. "The heading issued by the controller resulted in a flight track that continued toward the mountains," the report said.

"At night, clouds and terrain are difficult for pilots to see, and a gradual loss of visual cues can occur as flight is continued toward darker terrain," the report said. "Given that the accident flight occurred at night, over rural terrain and with few visual cues, and that the overcast cloud layer would have prevented moonlight from illuminating the terrain, it is likely that the flight crew did not see the rising terrain as the airplane continued toward it."

The company that owned the accident airplane told investigators that a terrain

awareness and warning system (TAWS) was scheduled to be installed in the airplane in January 2005.

'Knowledge and Opportunity'

The controller told investigators that he issued the 020-degree heading to keep the airplane out of Mexican airspace and to turn it toward the first waypoint listed on the flight plan. "The controller stated that he was aware of the mountainous terrain east [of the airport]," the report said. "When asked why he took no action to warn the flight crew of the airplane's proximity to terrain, the controller stated that it was the pilot's responsibility to avoid terrain when operating under VFR. ... The controller also stated that he was aware of the cloud ceiling at 2,100 feet AGL [above ground level] and that he expected the pilots to maintain VFR and to advise him if they were unable to do so."

Soon after the controller issued the heading assignment to the Learjet flight crew, a Mode C altitude return from the airplane's transponder generated an MSAW alert, consisting of an aural warning and a visual warning on the controller's radar display. The last Mode C return received from the airplane four seconds later also generated an MSAW alert.

The controller told investigators that he did not hear or see the MSAW alerts because he was communicating on a landline with a Tijuana Approach controller. The SOCAL controller provided a "radar point-out" of the Learjet, which was in Tijuana airspace, and told the Tijuana controller that it was "northbound out of your airspace."² He said that when he returned his attention to the radar display, the Learjet's data block had gone into "coast status," indicating that radar contact with the airplane had been lost.

The report said that recorded radar data and communication data do not support the controller's statement. "The MSAW alerts began 34 seconds before the controller initiated the call to the Tijuana controller. Radar contact with the airplane had been lost for 15 seconds when the controller began coordinating the flight's position with the Tijuana controller."

According to FAA's ATC manual, "the issuance of a safety alert is a controller's first priority regardless of whether the flight is operating under VFR or IFR," the report said.³ The manual also states that a controller assumes responsibility for terrain clearance if he or she issues an instruction, such as a turn to a specific heading.

"Regardless of his failure to appropriately apply the procedures for handling a VFR-IFR flight, the controller [involved in the accident flight] was aware of the topography near [Brown Field] and that the airplane was quickly approaching a mountainous area," the report said. "The controller had the knowledge and opportunity to alert the flight crew to an unsafe condition, but he failed to do so."

The accident occurred 30 seconds after the last MSAW alert. The crew of a San Diego Police Department helicopter, using night vision goggles and infrared imaging, found the wreckage about 20 minutes after the accident. The airplane had struck a mountain at 2,256 ft, about eight nm (15 km) east of Brown Field. The helicopter crew said that the main impact crater was 75 ft to 100 ft below a layer of broken-to-overcast clouds.⁴

Among actions taken after the accident were the addition of colored terrain contours to Brown Field approach charts published by the U.S. government and the addition of information in FAA's *Airport/Facility Directory*

about mountainous terrain near the airport. NTSB made no recommendations based on the accident investigation. ●

This article is based on NTSB Aircraft Accident Brief AAB-06/05, which comprises 22 pages, and NTSB public docket 38850, which comprises 332 pages and 37 photographs.

Notes

1. The report said that the Learjet was owned by Med Flight Air Ambulance, which also employed the crewmembers. The accident flight was conducted as a charter operation by ATI Jet, which wet-leased the airplane from Med Flight. The service agreement between the two companies had been approved by the U.S. Federal Aviation Administration (FAA) principal operations inspector assigned to ATI Jet. The report indicated, however, that the agreement did not comply with FAA regulations because Med Flight did not hold a certificate to conduct common carriage. "On June 10, 2005, the FAA issued Notice 8400.83 to its inspectors, clarifying the regulation that such wet-lease agreements are prohibited," the report said.
2. *Radar point-out* is defined by FAA as "an action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred."
3. FAA Order 7110.65P, *Air Traffic Control*.
4. The report noted that the accident site was less than 1.5 mi (2.4 km) from the site where a Hawker Siddeley DH-125 struck the mountain on a dark night March 16, 1991, killing all 10 occupants. The Hawker crew had departed under visual flight rules from Runway 08L at Brown Field and was trying to pick up an instrument flight rules clearance when the accident occurred. In report no. LAX91FA132, the U.S. National Transportation Safety Board said that the probable causes of the accident were "the pilot's failure to maintain proper altitude clearance over mountainous terrain and the copilot's failure to adequately monitor the progress of the flight."