



## Attempted Go-around with Deployed Thrust Reversers Leads to Learjet Accident

*The pilot said that he rejected the landing when the aircraft veered left after touchdown. He said that although the thrust levers were positioned full forward, the aircraft did not accelerate after lifting off the runway.*

—  
*FSF Editorial Staff*

On July 15, 1997, a Gates Learjet 35A struck terrain during an attempted go-around at Avon Park (Florida, U.S.) Municipal Airport. Several witnesses saw the aircraft touch down on the runway, then lift off and fly at a slow airspeed and at a low altitude before striking power lines and coming to rest in a farm field. The pilot and copilot — the sole occupants of the aircraft — sustained minor injuries. The aircraft was destroyed.

The U.S. National Transportation Safety Board said, in its final report, that the probable causes of the accident were “a loss of engine power as a result of the thrust reversers being deployed and [the] subsequent in-flight collision with wires.”

NTSB said, “Factors in this accident were the pilot’s disregard for procedures and the improper use of the thrust reversers.”

The pilot, 62, had an airline transport pilot (ATP) certificate and a Learjet type rating. He had 20,076 flight hours, including 1,500 hours in type.

The copilot, 30, had a commercial pilot certificate and a flight instructor certificate. He had 334 flight hours, including one hour in type.



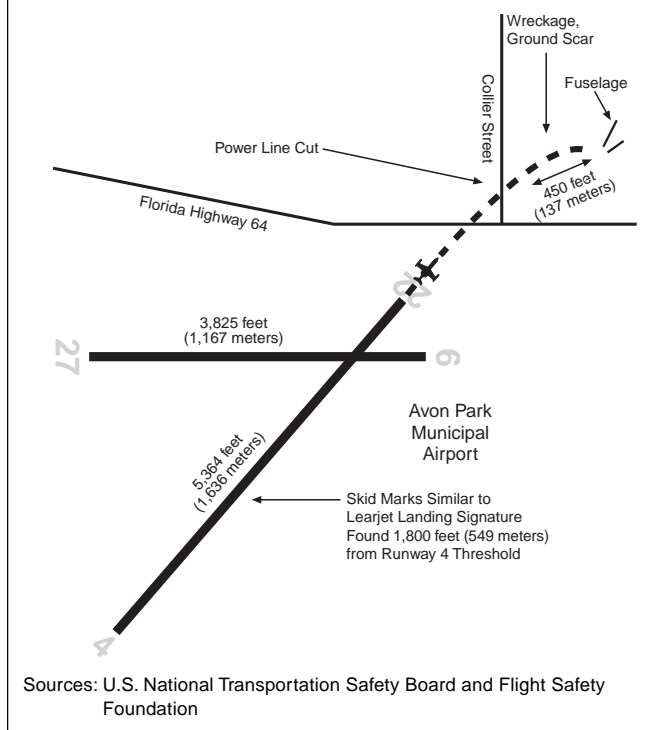
The aircraft, N19LH, was built in 1980 and had 13,726 hours in service. It was registered to an aircraft-sales company. The purpose of the flight was to ferry the aircraft from Fort Lauderdale, Florida, U.S., to Avon Park to be painted.

At 1853 local time, the pilot filed an instrument flight rules (IFR) flight plan with the St. Petersburg (Florida, U.S.) Automated Flight Service Station. Visual meteorological conditions prevailed on the route of flight. Avon Park had clear skies and 10 miles (16 kilometers) visibility. Winds were calm, and the surface temperature was 77 degrees Fahrenheit (25 degrees Celsius).

The aircraft departed from Fort Lauderdale Executive Airport at 1917. The report said that the flight proceeded uneventfully at a cruise altitude of 16,000 feet. Approaching the destination, the flight was cleared by air traffic control (ATC) to descend to 3,000 feet. The pilot canceled his IFR flight plan, and ATC terminated radar services, at 1938. The pilot flew the aircraft in a left traffic pattern for Runway 4 at Avon Park Municipal Airport.

Flight operations at the airport are not controlled by ATC. The airport has two runways (Figure 1, page 2). The aircraft

## Flight Path of Gates Learjet 35A, N19LH, Avon Park, Florida, U.S., July 15, 1997



**Figure 1**

landed at dusk on Runway 4, which was 5,364 feet (1,636 meters) long and 75 feet (23 meters) wide. The U.S. Federal Aviation Administration *Airport/Facility Directory* showed that the runway had a precision approach path indicator (PAPI) system. The runway was not served by an instrument landing system.

The report said, “Witnesses near the airport saw the flight circle once over the airport, approach on a left base to Runway 4, touch down and take off again.”

Among the witnesses were a paramedic and an emergency medical technician who parked their ambulance on the side of a highway (Florida Highway 64) off the end of Runway 22 to watch the Learjet land.

The paramedic (who also was a pilot) said, “[We] saw a large plane flying over Avon Park and went to the airport to watch the plane land. We were ... at the [approach] end of Runway 22, with the ambulance aiming down the runway. We saw the Lear on left downwind for Runway 4.”

The paramedic said that the aircraft overshot the turn from base leg to final approach: “[On] final approach, the plane was way south of [the extended centerline of the runway].” He said that the aircraft made “sharp” turns to the left and to the right before it touched down on the runway.

“By the time the pilot [landed the aircraft] on the runway, he had wasted approximately 1,200 [feet] to 1,500 feet [366 meters to 458 meters] of Runway 4,” said the paramedic.

“They [had] reverse thrust ... on full bore till they crossed [the intersection of Runway 9/27]. Then, they dumped the thrusters. [The aircraft] went approximately 200 yards [183 meters], pulled off the runway and flew over the left side of our ambulance at approximately 25 feet. [They were] trying to climb, but I don’t believe they had the speed, as they looked like they were stalling.”

The paramedic said that the aircraft struck a power line, entered a right-wing-down attitude and touched down on a turf-farm field. The report said that the landing gear were extended and the flaps were retracted when the aircraft touched down in the field at 1953.

A police officer said, “The plane missed [an] office building, but did strike several pieces of agricultural farm machinery. The collision with the [farm] equipment resulted in the wings being knocked off the plane. This caused the wing[-tip fuel] tanks to ignite and burn. The fuselage area of the plane traveled beyond the wings and came to rest right-side-up just short of trees on the property.”

Another witness said, “I am an ATP-rated pilot with type ratings [for the Cessna Citation and Boeing 737] and over 4,200 hours total time. I was at the scene of the accident when it occurred.

“I observed [the aircraft] fly over the airport from the south and enter a left-hand pattern for Runway 4. The pattern and final [approach] down to about 100 feet looked fine. (He was a little low, which I attributed to the short runway and trying to land on the numbers.) At that point, I turned away to walk to my own airplane.

“I turned back around to look when I heard the engines coming up to full power (different sound than reverse thrust). The plane was trying to gain altitude, but was hanging in the air, tail low, at around 50 feet AGL [above ground level]. It looked like a slow-flight demonstration at an air show.

“[The aircraft] was about halfway down the runway, desperately trying to climb. The airplane was oscillating left to right, trying to climb out.

“When the aircraft passed my vantage point, I could observe the thrust reverser guide vanes deployed on the left engine. Both engines seemed to develop full thrust, but the plane could not climb and was traveling at a slow airspeed.

“[The aircraft] crossed the airport fence [and] the adjacent highway, and, [after] striking some power lines, disappeared, right wing [low] and tail low, behind a small single-story building. When the plane struck the power lines, a transformer

blew. After [the aircraft] disappeared behind the building, I saw a big fireball and black smoke.

“An ambulance was going by on the road at that time. It turned on its lights and siren, turned around and went to the scene of the crash. The people with me and I started running toward the crash site. When we got there, the first emergency vehicles were already pulling up.”

The paramedic and emergency medical technician in the ambulance were the first to arrive at the accident site. The paramedic said that he saw the copilot emerge from the right side of the aft fuselage, and that he helped the pilot extract himself from the wreckage.

“Both pilots were [stunned] but OK,” said the paramedic. “The pilot had a one-inch abrasion [on his] shoulder and a half-inch laceration above [his] left eyebrow, and the copilot had ... pain in the chest area due to [contact with] harness belts. [I saw] five small lacerations on both [of the copilot’s] legs, three needing stitches.”

The report said that the pilot refused medical treatment and that the copilot was transported to a hospital for medical treatment.

The police officer said, “[I] did have the opportunity to see both pilots at close proximity. Neither of the men displayed any obvious signs of alcohol [impairment] or drug impairment. No signs were observed to suggest that either [pilot] had been consuming alcoholic beverages. [The paramedic], who checked both of the men for injury, concurred with this assessment.”

The police officer interviewed the pilot-in-command. “The pilot stated that he has been flying jet aircraft since 1962 and has extensive experience in numerous types of jet aircraft, including different models of Lear aircraft,” said the police officer. “He stated that he had flown the plane involved in this incident several times before. He said that at no time on any of those flights, nor on this particular flight, did he experience any equipment problems or malfunctions with the aircraft.

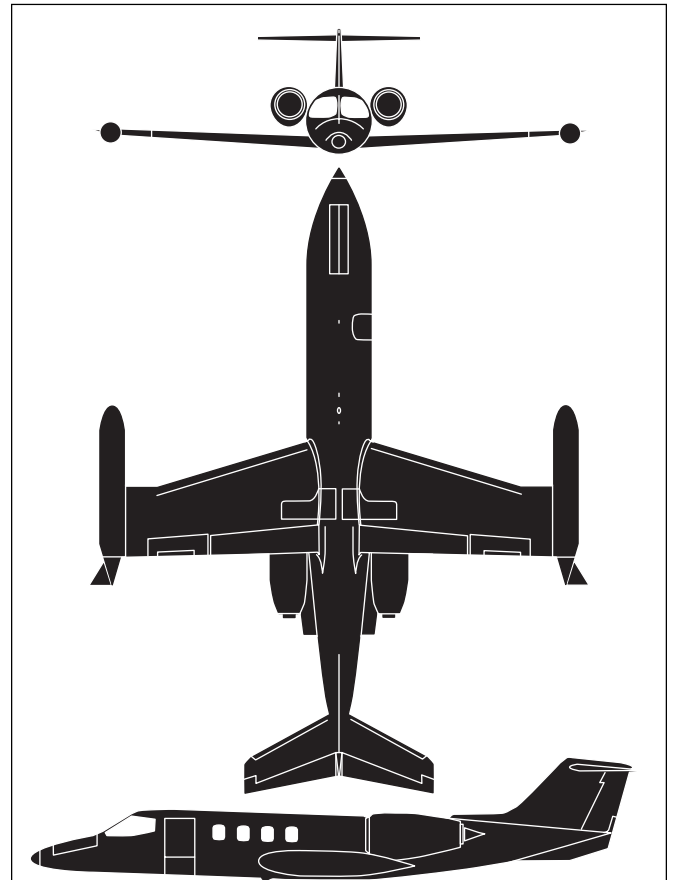
“He stated that he took off from Fort Lauderdale Executive Airport at approximately 1900 hours. ... The purpose of the flight was, he said, to ferry the plane ... for paint work. [The pilot] stated that, as he touched down, the reverse thrusters appeared to work properly. He then felt the need to do a go-around and pushed the throttles forward and lifted off.

“[The pilot] said that, at first, he felt that he had enough speed and ‘firewalled’ the throttles; but the aircraft did not accelerate properly. [The pilot] said that he believes that he did disengage the thrust reversers, but [he] did ask what position the levers were in.”

In his report to NTSB, the pilot said, “As the aircraft touched down at [Avon Park Municipal Airport], it swerved to the left,

off the [runway] centerline. Brakes were applied, but the aircraft continued to swerve to the left.

“[I] decided to apply reverse thrust. ... The swerve accelerated. Since the aircraft was almost off the runway, [I] attempted to stow the reversers. When the [thrust-reverser position] lights went out, [I] increased left throttle, raised the nose and was able to re-establish directional control.



### Gates Learjet 35A

The Gates Learjet 35A is powered by two AlliedSignal (formerly Garrett) TFE731-2-2B turboprop engines, each rated at 3,500 pounds thrust (15.6 kilonewtons). The wing-tip tanks, integral wing tanks and fuselage tank have a combined usable fuel capacity of 925 gallons (3,500 liters).

The airplane has seating for two pilots and up to eight passengers. Maximum takeoff weight is 18,300 pounds (8,300 kilograms). Maximum landing weight is 15,300 pounds (6,940 kilograms).

Maximum operating Mach number is 0.81. Maximum cruise speed at mid-cruise weight and 41,000 feet is 460 knots (852 kilometers per hour). Economy cruise speed at mid-cruise weight and 45,000 feet (the maximum operating altitude) is 418 knots (774 kilometers per hour). Landing distance at maximum landing weight is 3,075 feet (938 meters). Power-off stall speed with landing gear extended and flaps extended is 96 knots (178 kilometers per hour).

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

**Cockpit Voice Recorder Transcript,  
Gates Learjet 35A,  
Avon Park, Florida, U.S., July 15, 1997**

(FSF editorial note: The following transcript is as it appears in U.S. National Transportation Safety Board Factual Report MIA97FA213, except for minor column rearrangement and addition of notes defining some terms that may be unfamiliar to the reader. Local times are shown.)

Time	Source	Content
1950:08	RDO-1	* *, Learjet one nine Lima Hotel, Miami. we have the airport it looks like. about seven miles, twelve o'clock.
1950:14	CTR	* one niner Lima Hotel uh, roger.
1950:17	RDO-1	and uh, we'll cancel IFR with ya at this time sir. we appreciate your help very much.
1950:21	CTR	one niner Lima Hotel roger. just had another uh, aircraft go on in there. I lost him out of about two thousand feet. he was uh, should be talking to Unicom. radar service is terminated. squawk twelve hundred. frequency change approved Niner Lima Hotel.
1950:33	RDO-1	OK, thanks very much, Lima Hotel.
1950:40	CAM-1	and uh, Avon Park Unicom, Learjet One Nine Lima Hotel uh, entering the left downwind runway two two, Avon Park.
1950:51	CAM-1	OK, check list.
1950:53	CAM-2	check list, circuit breakers?
1950:54	CAM-1	in.
1950:55	CAM-2	circuit breakers?
1950:59	CAM-1	I'm in.
1951:00	CAM-2	hydraulic and emergency air pressure?
1951:02	CAM-1	and uh, checked checked.
1951:03	CAM-2	OK.
1951:04	CAM-1	both checked.
1951:05	CAM-2	V ref speeds?
1951:07	CAM-1	OK I'm, V ref's gonna be one ... twenty ... four.
1951:12	CAM-2	one twenty four checked? fuel?
1951:16	CAM-1	OK stop for traffic.
1951:19	CAM-2	* * traffic.
1951:21	CAM	[sound of roaring noise]
1951:22	CAM-1	* traffic, Learjet One Nine Lima Hotel entering left downwind runway uh, four, Avon Park.
1951:30	CAM-1	OK ... gear down.

“The aircraft accelerated normally, no lights were observed on the annunciator panel, [and] rotated with normal indications until approximately 100 [feet AGL to] 150 feet AGL, [where we] experienced a steady and rapid loss of power.”

The copilot said, “On July 16, 1997, I was copilot of Learjet 35 registration N19LH on a ferry flight from Fort Lauderdale Executive Airport to Avon Park Municipal Airport. The flight was on an IFR flight plan and was without incident.

“On arrival at [Avon Park Municipal Airport], the flight plan was closed, and [we] circled the airport for a landing on Runway 4. The approach was a left base. As the aircraft touched down, it swerved to the left. I don't remember if the thrust reversers were engaged or not.

“The captain elected to go around, and power was applied. The airplane accelerated smoothly and rapidly until rotation, where the aircraft had [a] steady and rapid loss of power. The aircraft continued its shallow flight path and came to rest off the airport in a field.”

Investigators found no parts of the Learjet on the runway or in areas around the runway. The report said, “A walk of Runway 4 by the NTSB, [U.S. Federal Aviation Administration] and [other] parties to the investigation revealed that [tire] skid marks similar to a Learjet landing gear signature [were] found about 1,800 feet [549 meters] from the approach end of Runway 4. There was no confirmation that the marks were from N19[L]H, and no marks in the touchdown area could be identified as being from N19[L]H. There were no marks observed on the runway that could be identified as going off the left or right side of the runway. ...

“Examination of the wreckage at a hangar at the Avon Park airport revealed that the left wing was about 60 percent consumed by fire. The leading edge had a section of cable lodged in it. ... The right wing had displayed fire damage at both the center section and the outboard end. The right wing tip tank and wing extension separated. ... The right tip tank fin was scratched and bent.

“The fuselage had separated from the wing and was broken in two. ... Wrinkling and damage [were] observed all along the fuselage. Examination of the empennage revealed that the left horizontal [stabilizer] and left elevator were bent down. ... The left forward engine beam failed at the fuselage, with about 12 inches [30 centimeters] of the upper cap staying with the mount and engine. The mount displayed evidence of bending moments in both the up and down directions. The right forward engine beam was broken at the fuselage and displayed a downward load at the fracture surface.

“The left engine was attached to the airplane, but had come to rest on the right side of the fuselage and was being held in place by wiring and hoses. Observation of the engine revealed signs of rotation on the fan blades.

“The right engine had separated during the impact sequence. Observation of the engine revealed signs of rotation on the fan blades.

“The airplane was equipped with two Aeronca thrust reversers. Examination of the left thrust reverser revealed that the translator was in the deployed position, with the blocker doors fully open. The translator was found 1.5 inches to three inches [3.8 centimeters to 7.6 centimeters] from full aft travel. Both the left and right pneumatic latches were found in the unlocked position. The inboard sequence latch was found about three inches forward of full aft travel. The latch hammer was engaged. The outboard sequence latch was found about 1.5 inches forward of full aft travel. The latch hammer was disengaged. Both the inboard and outboard flex-drive cable cores were found in an unserviceable condition. The pneumatic actuator was cranked by hand with the flex-drive cables removed. The actuator motor was not seized and appeared to be operational.

“Examination of the right thrust reverser revealed that the translator was in the deployed position, with the blocker doors fully closed. The translator was found one [inch] to two inches [2.5 centimeters to five centimeters] from full aft travel. The left pneumatic latch was found in the locked position. The right pneumatic latch was found in the unlocked position. The inboard sequence latch was found about two inches forward of full aft travel. The stop housing was broken and [was] found in the lower access area of the thrust-reverser body. The attaching screws, sliding blocker, pivoting blocker and housing fingers were still attached to the beam. The latch-hammer position could not be determined. The outboard sequence latch was found about one inch forward of full aft travel. The latch hammer was disengaged. The inboard flex-drive cable core was found sheared at the upper pinion gearbox end and was in an unserviceable condition. The outboard flex-drive cable core was found in an unserviceable condition. The pneumatic actuator was cranked by hand with the flex-drive cables removed. The actuator motor was not seized and was operational.”

The report said that the FAA in April 1979 issued an airworthiness directive (AD 79-08-01) on Learjet Models 35, 35A, 36 and 36A with Aeronca thrust reversers. The FAA said that the purpose of the AD was “to preclude inadvertent thrust reverser deployment and possible loss of aircraft control.” The AD required, among other actions, compliance with the following operating limitations:

- “Thrust reversers must not be operated prior to takeoff;
- “Thrust reversers must not be used to control taxi speed, except after landing;
- “Thrust reversers must not be used for touch-and-go landings; [and,]

**1951:32 CAM-2** gear’s down and locked, green lights no red.

**1951:34 RDO-1** [sound of Morse Code identifier “LAL”]

**1951:36 RDO-1** [sound of loud electronic low pitch tone for thirteen seconds]

**1951:45 CAM-1** gear down and locked, captain. OK, flaps, flaps to full captain.

**1951:48 CAM-2** flaps to full.

**1951:51 57LL** hey #, five seven Lima Lima, are we at the right place?

**1951:55 RDO-1** that’s affirmative.

**1951:57 57LL** roger that, #.

**1951:58 CAM-2** flaps to full.

**1952:00 CAM-1** OK, check list.

**1952:02 CAM-2** check list. hydraulics and emergency air pressure, checked ... Vref, one twenty four. fuel’s balanced ... wait.

**1952:23 CAM-1** OK, fuel balance checked.

**1952:27 CAM-2** fuel balance checked.

**1952:27 CAM-1** flaps to full. green lights lit?

**1952:33 CAM-1** green lights are lit? right?

**1952:35 CAM-2** right.

**1952:38 CAM** [sound of two thumps similar to aircraft touching down on the runway]

**1952:42 CAM** [sound similar to increase in engine noise]

**1952:48 CAM** [sound of six irregular thumps]

**1952:50 CAM** [sound of change in engine noise]

**1952:55 CAM-1** we’re gonna die my son, we’re gonna die. have mercy on us dear Lord

**1953:00 CAM-1** have mercy Lord

**1953:03** END of RECORDING

**RDO** = Radio transmission from accident aircraft  
**CAM** = Cockpit area microphone voice or sound source  
**CTR** = Radio transmission from Miami Approach Control  
**57LL** = Radio transmission from aircraft 57LL  
**-1** = Voice identified as pilot-in-command  
**-2** = Voice identified as copilot  
**\*** = Unintelligible word  
**[ ]** = NTSB editorial insertion  
**...** = Pause  
**#** = Name deleted by FSF editorial staff  
**IFR** = Instrument flight rules  
**LAL** = Lakeland (Florida) very-high-frequency omnidirectional radio (VOR)

Source: U.S. National Transportation Safety Board

- “After thrust reversers have been deployed, a visual check of proper door stowing must be made prior to takeoff.”

The AD said, however, that compliance with these limitations was not required in an aircraft equipped with airplane modification kit (AMK) 81-6. The accident aircraft was equipped with AMK 81-6.

The report said, “The AMK installs thrust reverser blocker door position indicator (DPI) switches and provides an indication, a flashing UNLOCK light, in the event the blocker doors stow inside the [engine-exhaust] duct. In the event the DPI system should fail, the UNLOCK light stays on steady when the DEPLOY light comes on. ... According to the [aircraft flight manual], ‘when the reversers are fully stowed, the UNLOCK light will go out.’ ... A caution note [in the AFM] states, ‘Do not advance the power above idle until the DEPLOY and UNLOCK lights are out.’”

The report said that the NTSB investigator-in-charge (IIC) requested that Learjet (the company that currently manufactures Learjet aircraft) ask FlightSafety International, which provides Learjet pilot training, what procedures are taught for the use of thrust reversers during landings. The report said that the response was: “FlightSafety trains pilots to use thrust reverse only on full-stop Learjet landings. Pilots are

trained not to deploy ... thrust reverse during [touch-and-go landings] or during [rejected] landings.”

The report said, “The reason that Learjet gave for this procedure was that the thrust reversers may not be fully stowed when the airplane starts the takeoff [during a touch-and-go landing or during a rejected landing].

“In a telephone conversation with the pilot-in-command of N19LH, the [IIC] asked if he was aware of the limitations on the Aeronca thrust reverser [system] and if he knew that once the thrust reverser[s were] deployed that he was committed to land. The pilot told the IIC that he knew of the limitations and that he knew he was committed to land. However, it was his judgment that the airplane was going to depart the side of the runway, and he elected to abort the landing.”

In the section of the report that solicited recommendations by the aircraft owner or aircraft operator on how the accident could have been prevented, the president of the company that operated the accident aircraft said, “Place a device so that power can not be fully applied while [the] thrust reversers are deployed.”♦

Editorial note: This report was based on U.S. National Transportation Safety Board (NTSB) Factual Report MIA97FA213 and NTSB Brief of Accident MIA97FA213. The 78-page factual report includes a diagram and photographs.

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