



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	AVON PARK, FL	<b>Accident Number:</b>	MIA97FA213
<b>Date &amp; Time:</b>	07/15/1997, 1953 EDT	<b>Registration:</b>	N19LH
<b>Aircraft:</b>	Gates Learjet 35A	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	2 Minor

**Flight Conducted Under:** Part 91: General Aviation - Positioning

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## Analysis

Witnesses near the airport saw the flight approach on a left base to runway 4, touchdown on the runway, and takeoff again. One witness, a pilot, said the airplane turned onto final to the 'south' (right) of the runway centerline.' The airplane made a 'sharp' turn to the left to realign with the runway center, slightly overshot the runway to the left, turned to the right 'sharply,' and touched down on the runway. The witness further stated, '...by the time the pilot was on the runway he had wasted approximately 1,200 to 1,500 feet of runway 4, they hit reverse thrusters [sic] and were on full bore till they crossed runway 27 and 9.' The witness saw heat come out of both engine thrust reversers, the nose gear touched down and then came up again. He then saw the airplane come off the ground about 30 to 40 feet, wobble left and right at a 'slow airspeed,' crossover a highway at a low altitude, right wing low, strike some wires, go into a field, and catch fire. The pilot said, when he touched down on the runway, the airplane seemed to 'lurch' to the side. He said at this point his airspeed was 126 knots. He elected to abort the landing, and applied full power. He said the engines would not develop thrust and he elected to land in a field less than 1/4 mile in front of him. Examination of the left thrust reverser revealed that the translator was in the deployed position, with the blocker doors fully open. Both the left and right pneumatic latches were found in the unlocked position. Examination of the right thrust reverser revealed that the translator was in the deployed position, with the blocker doors fully closed. The left pneumatic latch was found in the locked position. The right pneumatic latch was found in the unlocked position. The inboard sequence latches were found about 2 inches forward of full aft travel. The thrust reverser switch was found in the 'NORMAL' position. According to Gates Lear Jet Airworthiness Directive (AD) 79-08-01, '...to preclude inadvertent thrust reverser deployment and possible loss of aircraft control....,' the following limitations apply to all gates Lear Jet Model 35, 36, 35A, 36A, aircraft equipped with Aeronca Thrust reversers. According to the AD, Section I-LIMITATION; '...Thrust Reversers must not be operated prior to takeoff...Thrust Reversers must not be used for touch and go landings...After Thrust Reversers have been deployed, a visual check of proper door stowing must be made prior to takeoff...Operational Procedures in this Thrust Reverser Supplement are mandatory.' According to Lear Jet and FlightSafety International, the procedures that are taught to Lear Jet pilots in the use of thrust reverse and spoilers during landings are; '...pilots [are] to use thrust reverse only on full stop Lear Jet landings. Pilot are

trained not to deploy spoilers or thrust reverse during touch and go's or during balked landings.' The pilot-in-command of N19LH at the time of the accident, told the NTSB investigator-in-charge (IIC) that he was 'aware' of the limitations on the Aeronca Thrust Reverser and he knew that once the Thrust Reverser was deployed that he was 'committed' to land. The pilot told the IIC that he knew of the limitations and that he was committed to land.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: a loss of engine power as a result of the thrust reversers being deployed and subsequent in-flight collision with wires. Factors in this accident were the pilot's disregard for procedures, and the improper use of the thrust reversers.

### Findings

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Occurrence #1: LOSS OF ENGINE POWER

Phase of Operation: LANDING - ABORTED

Findings

1. ALL AVAILABLE RUNWAY - NOT USED - PILOT IN COMMAND
2. EMOTIONAL REACTION - PILOT IN COMMAND
3. (F) PROCEDURES/DIRECTIVES - NOT COMPLIED WITH - PILOT IN COMMAND
4. ABORTED LANDING - INITIATED - PILOT IN COMMAND
5. (C) THRUST REVERSER - DEPLOYED INADVERTENTLY
6. (F) REVERSERS - IMPROPER USE OF - PILOT IN COMMAND

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Occurrence #2: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: CLIMB

Findings

7. OBJECT - WIRE,STATIC

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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

8. TERRAIN CONDITION - GROUND

## Factual Information

### HISTORY OF FLIGHT

On July 15, 1997, about 1953 eastern daylight time, a Gates Learjet 35A, N19LH, registered to Orion Aircraft Sales Inc., crashed after an aborted landing at Avon Park, Florida. Visual meteorological conditions prevailed at the time and an instrument flight rules (IFR) flight plan was filed for the Title 14 CFR Part 91, positioning flight. The airline transport-rated pilot and commercial-rated copilot received minor injuries. The airplane was destroyed. The flight had originated from the Fort Lauderdale Executive Airport, Florida, the same day at 1917.

At 1853:56, the pilot of N19H, called the St. Petersburg AFSS (Automated Flight Service Station) to file an IFR flight plan. He was informed by the briefer that his flight plan data was entered into the system. The telephone conversation was ended at 1855:17.

The flight proceeded without incident, and at 1930:00, the flight was cleared to descend to 4,000 feet. A subsequent clearance to 3,000 feet was issued at 1937:27. The pilot cancelled IFR at 1938:28, and radar service was terminated.

Witnesses near the airport saw the flight circle once over the airport, approach on a left base to runway 4, touchdown, and takeoff again. One witness, a pilot, told the NTSB IIC (investigator-in-charge) that he observed the airplane turn onto final to the "south" (right) of the runway centerline." The airplane made a "sharp" turn to the left to realign with the runway center, slightly overshot the runway to the left, turned to the right "sharply," and touched down on the runway. The witness further stated, "...by the time the pilot was on the runway he had wasted approximately 1,200 to 1,500 feet of runway 4, they hit reverse thrusters [sic] and were on full bore till they crossed runway 27 and 9." The witness saw heat come out of both engine thrust reversers, the nose gear touched down and then came up again. He then saw the airplane come off the ground about 30 to 40 feet, wobble left and right at a "slow airspeed," crossover a highway at a low altitude, right wing low, strike some wires, go into a field, and catch fire.

The pilot in a statement to local police said, when he touched down on the runway, the airplane seemed to "lurch" to the side. He said, at this point his airspeed was 126 knots. He elected to abort the landing, and applied full power. He said the engines would not develop thrust and he elected to land in a field less than 1/4 mile in front of him.

The accident occurred during the hours of dusk approximately 27 degrees, 35 minutes north, and 081 degrees, 31 minutes west.

### PERSONNEL INFORMATION

Information on the pilot is contained in this report on page 3, under First Pilot Information. Information on the second pilot is contained in this report on Supplement E.

### METEOROLOGICAL INFORMATION

Visual meteorological conditions prevailed at the time of the accident. Meteorological information is contained in this report on page 3, under Weather Information.

### FLIGHT RECORDERS

The Universal model 30A cockpit voice recorder (CVR), was examined at the NTSB audio laboratory on July 23, 1997, and a transcript was prepared of 02:55 minutes of the 32:03

minute recording. Information and the transcript of the CVR are contained in this report, under Cockpit Voice Recorder, Factual Report of Group Chairman.

#### WRECKAGE INFORMATION

An examination of runway 4, revealed that there were no parts of the airplane found on the runway or the areas around the runway. A walk of runway 4 by the NTSB, FAA and parties to the investigation revealed that skid marks similar to a Learjet landing gear signature was found about 1,800 feet from the approach end of runway 4. There was no confirmation that the marks were from N19H, and no marks in the touchdown area could be identified as being from N19H. There were no marks observed on the runway that could be identified as going off the left or right side of the runway.

After leaving the runway the airplane traveled on a heading of 040 degrees about 1,000 feet and was seen by the witness striking a single power line, and cutting the line. Scrape marks from the right wing tip tank were found in the pavement of the road. The airplane was then seen impacting right wing first in a field behind a building, striking a tractor mower and continuing on a heading of 040 degrees shedding parts for about 450 feet. The airplane came to rest with the fuselage and nose of the airplane heading north.

Examination of the wreckage at a hanger 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 at about wing station (WS) 177.

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 at WS 181. The right tip tank fin was scratched and bent.

The fuselage had separated from the wing and was broken in two, about station 346.63. Wrinkling and damage was observed all along the fuselage.

Examination of the empennage revealed that the left horizontal and left elevator were bent down and under the horizontal stabilizer. The left forward engine beam failed at the fuselage with about 12 inches 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 1/2 inches to 3 inches from full aft travel. Both the left and right pneumatic latches were found in the unlocked position. The inboard sequence latch was found about 3 inches forward of full aft travel. The latch hammer was engaged. The outboard sequence latch was found about 1 1/2 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 1 to 2 inches 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 2 inches forward of full aft travel. The stop housing was broken and 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 1 inch forward of full aft travel. The latch hammer was disengaged. The inboard flex drive cable core was found sheared at the upper pinion gear box 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 lower inboard operating rod displayed an "S" shaped bend. The corresponding yoke base was also bent.

The engine thrust reverser light panel was removed for further examination. The thrust reverser switch was found in the "NORMAL" position.

#### TEST AND RESEARCH

The engine thrust reverser light panel was taken to the NTSB's Materials Laboratory, Washington, DC, to attempt to determine if any light bulbs were illuminated at the time of impact. According to the factual report of the examination of the light panel, "...visual examination revealed only the left engine DEPLOY indicator contained a broken filament...there was no evidence of hot stretching on any filaments, nor any evidence that the broken filament was illuminated when it separated."

An audio analysis was made of the CVR tape in an attempt to analyze the engine noise to determine the application of reverse thrust, after landing. The analysis was "inconclusive."

#### ADDITIONAL INFORMATION

According to Gates Learjet Airworthiness Directive (AD) 79-08-01, "...to preclude inadvertent thrust reverser deployment and possible loss of aircraft control....," the following limitations apply to all gates Learjet Model 35, 36, 35A, 36A, aircraft equipped with Aeronca Thrust reversers. According to the AD, Section I-LIMITATION; "...7. Thrust Reversers must not be operated prior to takeoff...8. Thrust Reversers must not be used to control taxi speed, except after landing...9. Thrust Reversers must not be used for touch and go landings [Note: At the time of the accident the AFMS (aircraft flight manual supplement) for Aeronca Thrust Reverser did not refer to the Touch and Go limitations, similar to the one in AD-79-08-01. At the request of the NTSB IIC, Learjet is in the processes of revision the AFM to add the Touch and Go limitations]...10. After Thrust Reversers have been deployed, a visual check of proper door stowing must be made prior to takeoff...11. Operational Procedures in this Thrust Reverser Supplement are mandatory."

AD 79-08-01, was not applicable to N19LH as Airplane Modification Kit (AMK) 81-6 had been accomplished on both thrust reversers. 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 duct. In the event the DPI system should fail the UNLOCK light stays on steady when the DEPLOY light comes on and prior to the next takeoff

the reverser must be repaired or pined. According to the AFM, "...when the reversers are fully stowed, the UNLOCK light will go out." On page 6 of the AFM: W1072, item 5, "Thrust Reverser Position Lights-Out, under AFTER-LANDING," there is a "CAUTION" note that states, "Do not advance the power above IDLE until the DEPLOY and UNLOCK lights are out."

The NTSB investigator-in-charge (IIC), requested that the Director of Flight Operations, Learjet, make an inquiry to FlightSafety International, and find out what procedures are being taught to Learjet pilots in the use of thrust reverse and spoilers during landings. In a memorandum from the Director of Standards, FlightSafety, to the Director of Flight Operations, Learjet, dated July 22, 1997, it was stated that, "FlightSafety trains pilots to use thrust reverse only on full stop Learjet landings. Pilots are trained not to deploy spoilers or thrust reverse during touch and go's or during balked landings." The reason that Learjet gave for this procedure was that the thrust reversers may not be fully stowed when the airplane starts the takeoff.

In a telephone conversation with the pilot-in-command of N19LH, the NTSB investigator-in-charge (IIC) asked if he was "aware" of the limitations on the Aeronca Thrust Reverser and if he knew that once the thrust reverser was 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 judgement that the airplane was going to depart the side of the runway and he elected to abort the landing.

The aircraft wreckage was released to Mr. William Harwell Jr., representing Orion Aircraft Sales Inc., on July 16, 1997.

## Pilot Information

<b>Certificate:</b>	Airline Transport; Flight Instructor	<b>Age:</b>	62, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane Multi-engine; Airplane Single-engine	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Valid Medical--w/ waivers/lim.	<b>Last FAA Medical Exam:</b>	05/20/1997
<b>Occupational Pilot:</b>	<b>Last Flight Review or Equivalent:</b>		
<b>Flight Time:</b>	20076 hours (Total, all aircraft), 1500 hours (Total, this make and model), 19000 hours (Pilot In Command, all aircraft), 194 hours (Last 90 days, all aircraft), 55 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	Gates Learjet	Registration:	N19LH
Model/Series:	35A 35A	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Utility	Serial Number:	279
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	02/06/1997, Continuous Airworthiness	Certified Max Gross Wt.:	18300 lbs
Time Since Last Inspection:	190 Hours	Engines:	2 Turbo Fan
Airframe Total Time:	13726 Hours	Engine Manufacturer:	Garrett
ELT:	Not installed	Engine Model/Series:	731-2-2B
Registered Owner:	ORION AIRCRAFT SALES INC.	Rated Power:	3500 lbs
Operator:	ORION AIRCRAFT SALES INC.	Operating Certificate(s) Held:	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Dusk
Observation Facility, Elevation:	GIF, 146 ft msl	Distance from Accident Site:	35 Nautical Miles
Observation Time:	1851 EDT	Direction from Accident Site:	340°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:	360°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	25°C / 21°C
Precipitation and Obscuration:			
Departure Point:	FT LAUDERDALE, FL (FXE)	Type of Flight Plan Filed:	IFR
Destination:	(AVO)	Type of Clearance:	IFR
Departure Time:	1917 EDT	Type of Airspace:	

## Airport Information

Airport:	AVON PARK MUNICIPAL (AVO)	Runway Surface Type:	Asphalt
Airport Elevation:	155 ft	Runway Surface Condition:	Dry
Runway Used:	4	IFR Approach:	None
Runway Length/Width:	4000 ft / 75 ft	VFR Approach/Landing:	Full Stop; Traffic Pattern

## Wreckage and Impact Information

Crew Injuries:	2 Minor	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Minor	Latitude, Longitude:	

## Administrative Information

Investigator In Charge (IIC):	ALAN J YURMAN	Report Date:	05/04/1998
Additional Participating Persons:	BENJAMIN H HARRIS; ORLANDO, FL JAMES B TIDBALL; WICHITA, KS		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).