National Transportation Safety Board
Aviation Accident Final Report

Location:	Sierra Blanca, TX	**Accident Number:**	FTW02FA048
Date & Time:	12/10/2001, 1821 MST	**Registration:**	N997TD
Aircraft:	Gates Learjet 24D	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

The twin-turbojet, transport-category airplane was destroyed when it departed controlled flight during descent into its final destination and impacted terrain. The flight was cleared to descend from FL 390 to 10,000 feet, and the flight crew established a 4,000-foot/minute descent. As the airplane descended through FL 219, air traffic control requested the pilot contact approach control. However, the pilot read back an incorrect frequency and spoke an unintelligible word. The controller attempted to correct the pilot; however, no additional communications were received from the flight crew. Located within a pause in the pilot's last transmission, a 1680 Hz frequency could be heard for 0.1 seconds. There are only two systems in the airplane with aural warning systems within that frequency range; the cabin altitude warning, and the overspeed warning (both systems were destroyed during the accident sequence). Shortly after the last transmission from the pilot, radar data depicted the airplane climbing back up to FL 231 before entering a steep and rapid descent. A performance study indicated that just prior to the loss of control, the airplane exceeded its maximum operating airspeed of 300 knots calibrated. However, according to the manufacturer, the airplane had been successfully flown at airspeeds up to 400 knots calibrated without loss of control. The right wing and sections of the right horizontal stabilizer/elevator separated from the airplane just prior to its impact with terrain and were located approximately 200-250 feet from the main impact crater. No anomalies with the airframe or engine were found that would have led to the loss of control. A cockpit voice recorder was installed in the accident airplane; however, it did not record the accident flight.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: loss of control during descent for undetermined reasons.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - NORMAL

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
2. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On December 10, 2001, at 1821 mountain standard time, a Gates Learjet 24D transport category, twin turbojet airplane, N997TD, operating as Turbodog 36, was destroyed when it impacted terrain following an uncontrolled descent near Sierra Blanca, Texas. The airplane was registered to and operated by Air Cargo Express Inc., of Fort Wayne, Indiana. The airline transport rated captain and the commercial rated co-pilot sustained fatal injuries. Night visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed for the 14 Code of Federal Regulations Part 91 positioning flight. The flight originated from the Harlingen Valley International Airport, Harlingen, Texas, at 1700, and was destined for the El Paso International Airport, El Paso, Texas.

It should be noted that unless otherwise indicated, all times are in mountain standard time (MST). According to radar and communication data obtained from the Albuquerque Air Route Traffic Control Center (ZAB ARTCC), they provided air traffic control service during the descent portion of the flight from a point approximately 115 miles southeast of ELP. At 1809:26, ZAB cleared the pilot to descend "at pilot's discretion" from Flight Level (FL) 390 to 10,000 feet. The pilot acknowledged, stating "we'll take it nice and slow." At 1814:42, ZAB instructed the pilot to turn left ten degrees for separation from ELP departing traffic. The pilot acknowledged. At 1817:28, ZAB asked the pilot to "increase rate of descent if you can." The pilot replied that they would increase the descent by 1,000 feet/minute and asked at what altitude he could expect to turn back direct to ELP. The controller replied "about 25 [thousand]." The pilot replied that "would be no problem, we're coming down about 4,000 feet/minute."

At 1819:10, ZAB cleared the flight direct to ELP, and the pilot acknowledged. At that point, radar data depicted the flight descending through FL266. At 1821:06, ZAB instructed the pilot to contact ELP approach control (the flight's mode C transponder depicted the airplane at FL219). The pilot acknowledged with an incorrect frequency and uttered an unintelligible sound. The controller attempted to correct the readback, but no response was received and the pilot never contacted ELP approach control. During this exchange the transponder's mode C function indicated the airplane climbed to FL225. The airplane continued to climb to FL231 and at 1821:20 no mode C was received from the airplane.

The final radar contact was 37 nautical miles from the El Paso very high frequency omnidirectional range (VOR) navigational facility along the 103-degree radial. The flight crew did not contact ELP TRACON, and no distress calls were received.

A search for the airplane was initiated and, at 2000, local authorities located the accident site on a private ranch.

PERSONNEL INFORMATION

The captain held an airline transport certificate with type ratings in the Douglas DC-3 and Learjets (both the 23/24 models and the 35 model). He also held a commercial certificate for single-engine airplanes with type ratings for the Lockheed B-34 and the Douglas B-26 (the latter two aircraft are considered vintage airplanes and the pilot was only permitted to fly them in visual flight conditions). According to records provided by Air Cargo Express Inc., the captain was hired on November 3, 2000. At the time the captain was hired, he had

accumulated a total of approximately 20,000 hours, of which 10,000 were in multi-engine aircraft, 10,000 hours were in jet-type aircraft. The pilot reported accumulating 10,000 hours during night conditions. On June 8, 2001, the captain underwent his most recent FAR Part 135 airman competency/proficiency. At the time of the accident he had accumulated approximately 20,650 hours. Additionally, he held a first class medical certificate that was issued September 11, 2001. The medical certificate contained the following limitation: "Holder shall wear corrective lenses while exercising the privileges of his/her airman certificate."

According to Air Cargo Express' flight and duty log, the captain did not work on the 8th and 9th of December. Prior to that, the captain logged 8.0 hours of duty time, of which 6.4 hours were flight time on December 7, 2001. On December 6, 2001, the pilot logged 7.3 hours of duty time, of which 6.2 hours were consumed while flying.

On August 1, 2000, the co-pilot was issued a commercial pilot certificate. He held single-engine land, multi-engine land, and instrument airplane ratings. According to records provided by Air Cargo Express Inc., the co-pilot underwent initial second-in-command ground training on June 24, 2001. As of July 11, 2001, he had accumulated a total of 1,400 hours, of which 150 hours were in multi-engine aircraft, 20 hours were in jet-type aircraft, and 100 hours were during night conditions. On July 11, 2001, he underwent his most recent FAR Part 135 airman competency/proficiency check. At the time of the accident he had accumulated approximately 1,715 hours, of which approximately 315 hours were in the Lear 24. Additionally, he was issued a second-class medical certificate on June 26, 2001. The medical certificate contained the following limitation: "Must wear corrective lenses."

According to Air Cargo Express' flight and duty log, the co-pilot did not work during the four days preceding the accident.

AIRCRAFT INFORMATION

The 1972-model airplane (serial number 247) was powered by two General Electric CJ610-6 turbojet engines (left engine serial number 251-657A, and right engine serial number 251-299A), which were rated at 2,950 pounds of thrust each. Photographs of the airplane taken prior to the accident revealed it was painted navy blue on the bottom 1/3rd of the airplane, encompassing the belly and wings. Three painted stripes; one navy blue, one gold, and another navy blue, topped the solid blue belly paint and were separated by white paint. The remaining top 2/3rds of the airplane was painted white, with the exception of the registration number and company logo. The wing tip tanks displayed a similar paint scheme as the fuselage, but to a smaller scale.

The Learjet 24D's elevator and ailerons are operated mechanically through a system of cables, pulleys, push-pull tubes, and bellcranks. The rudder is operated through a system of cables, pulleys, and bellcranks. The aileron, rudder, and stabilizer trim systems are electrically driven. The flaps are operated utilizing a system of hydraulic pressure, actuating cylinders at each flap, and interconnecting cable that synchronizes the flaps through their range of travel. The spoilers are operated utilizing a system of hydraulic pressure and actuators at each spoiler panel.

The airplane was established on an FAA approved airworthiness inspection program (AAIP). At the time of the accident, the airplane had accumulated approximately 7,970 total flight hours. According to the maintenance records, on December 7, 2001, at an aircraft total time of 7,966.4 hours, the aircraft had its emergency gyro battery deep-cycled, and its left engine

replaced. The installed left engine serial number was 251-657A and had a total time of 6,968.0 hours, and a total time since overhaul of 3,954.7 hours. On October 31, 2001, at an airplane total time of 7,860.1 hours, an overhauled yaw servo unit was installed. On October 30, 2001, at an aircraft total time of 7,857.9 hours, maintenance personnel complied with the 2,400-hour replacement of the primary control cables, and conducted a detailed inspection of the flap system.

The airplane underwent its last AAIP inspection on September 10, 2001, at an aircraft total time of 7,763.7 hours, when a 300-hour Phase A1-A6 inspection was completed on both the airframe and the engine. During that inspection the #1 navigational transmitter and captain's directional gyro were replaced, and the horizontal-to-vertical stabilizer gap fairings were replaced along with the main landing gear wheels.

On August 9, 2001, at an aircraft total time of 7,663.6 hours, the co-pilot's directional gyro was replaced. On June 12, 2001, the spoiler attachment bolts were replaced. On June 12, 2001, at an aircraft total time of 7,516.2 hours, the captain's vertical gyro was changed, the co-pilot's attitude indicated was replaced with a serviceable unit, and the autopilot control panel was replaced.

On May 21, 2001, at an aircraft total time of 7,464.4 hours, the airplane and engines underwent a 300-hour Phase A1-A6 and a 600-hour Phase B1-B6 inspection as per the Air Cargo Express AAIP. During the aforementioned inspection, the stabilizer actuator was replaced with an overhauled unit (part number 2581037-47).

According to Air Cargo Express' airworthiness status record, on the morning of the accident, the airplane had accumulated a total of 7,966.4 flight hours. The left engine accumulated a total of 6,968.0 hours and 7,163.0 cycles, and 3,954.7 hours and 3,847.0 cycles since its last overhaul. The right engine had accumulated a total of 7,666.3 hours and 8,222.0 cycles on the morning of the accident, and 5,072.9 hours and 4,284.0 cycles since its last overhaul.

METEOROLOGICAL INFORMATION

At 1751, the weather observation facility at the El Paso International Airport, El Paso, Texas (located approximately 48 miles west-northwest of the accident site), reported a few clouds at 25,000 feet, visibility 10 statute miles, temperature 51 degrees Fahrenheit, dew point 30 degrees Fahrenheit, wind from 140 degrees at 10 knots, and an altimeter setting of 29.75 inches of mercury.

On December 10, 2001, the U.S. Naval Observatory's Astronomical Applications Department recorded sunset and the end of civil twilight at El Paso to be 1702 and 1729, respectively. The moonrise occurred at 0333 on the morning of the 11th.

A meteorological study was conducted by the NTSB utilizing information obtained from the University of Wisconsin's Space Science and Engineering Center's McIDAS (Man computer Interactive Data Access System), the National Oceanic and Atmospheric Administration (NOAA), and the National Weather Center (NWC). According to the information gleaned from these services, the cloud tops were near 10,800 feet, the freezing level was near 11,000 feet, no turbulence was displayed between 20,000 and 25,000 feet in the accident area, no mountain wave activity was diagnosed or forecast between 10,000 and 39,000 feet near western Texas, nor were there any AIRMETS, SIGMETs, or Convective SIGMETs issued for Texas during the accident time.

FLIGHT RECORDERS

The accident airplane was equipped with a Fairchild A100 cockpit voice recorder (CVR) that had sustained severe structural damage during the accident. The CVR was taken to the NTSB's Vehicle Recorder Lab in Washington, D.C. The internal recording tape also sustained substantial damage and was extracted and repaired. Although audio information had been recorded, it became evident that the audio recorded was not audio from the accident flight. Specifically, there was a female and male crew recorded (the accident crew consisted of two males) calling for the before taxi and before takeoff checklists, prior to takeoff from an airport in the Chicago area. After listening to the first 15 minutes of the tape, it was determined that the accident flight had not been recorded.

A flight data recorder (FDR) was not installed on the accident airplane, nor was one required by regulation.

WRECKAGE AND IMPACT INFORMATION

The accident site was situated at 031 degrees 32.67 minutes north latitude and 105 degrees 37.331 minutes west longitude. The accident site consisted of an impact crater that measured 17 feet by 30 feet. The main impact crater was excavated to a depth of 6 feet when a rock layer was met. The northeast, northwest, and southwest quadrants of the crater were excavated 6 feet until undisturbed dirt was met. The southeast quadrant of the crater was excavated 4 feet until undisturbed dirt was met. Debris comprising of soil and fragmented components of the airplane, were located in a fan distribution emanating outward from the crater to the north-northwest and ending approximately 1/4 miles from the crater.

The right wing separated from the aircraft at near wing station (WS) 25.0, and was located 250 feet south of the main impact crater. Wing skin at the separation was bent downward. The wing's leading edge metallic strip displayed a smeared sky blue paint in the spanwise direction. The forward portion of the right wing tip tank, between tip tank stations (TTS) 46 and 83.85, came to rest 385 feet south-southwest of the main impact crater. The forward section of the right tip tank, between TTS 0 and 46, was located 150 feet south-southeast of the main impact crater. The left wing was fragmented and located throughout the fan distribution north-northwest of the main impact crater. The largest section of left wing, which consisted of an outboard section from WS 125 to WS181, was located 225 feet north of the main impact crater. The forward section of the left wing tip tank, from TTS 0 to 46, was located 385 feet north of the main impact crater.

The right horizontal stabilizer was located 200 feet southeast of the main impact crater. The left horizontal stabilizer was fragmented and located throughout the fan distribution. The entire lower section of left horizontal stabilizer skin was located 210 feet northeast of the main impact crater. The vertical stabilizer was fragmented within the fan distribution. The largest section of the vertical stabilizer was located 124 feet northwest of the main impact crater.

All flight control surfaces were accounted for at the accident site. The horizontal stabilizer trim actuator nut-screw assembly was measured at 0.5 inches from the full nose down mechanical stop position. According to Learjet, this measurement equates to approximately -1.39 degrees (near the full nose down travel point). The horizontal stabilizer trim limits are -0.50 to -7.50 degrees nominal. This measurement equates to a trimmed position for a speed of 280 knots +/-40 Knot Calibrated AirSpeed (KCAS), for an airplane weighting 9,000 lbs, loaded 25% Mean Aerodynamic Chord (MAC), and at an altitude of 22,000 feet.

The right aileron remained attached to its wing attach point. The left aileron was recovered in sections and the trim tab (located on the left aileron only) deflection was not measurable. The aileron trim tab nominal deflection is +/- 8 degrees. The aileron system control continuity could not be established.

The rudder was fragmented and located throughout the fan distribution. The rudder trim tab was separated from the rudder and its deflection was not measurable. Rudder trim tab nominal deflection range is +/-15 degrees. Rudder system control continuity could not be established.

Both elevators separated from their respective horizontal stabilizers. Each elevator separated into three sections. The left-hand outboard section of the left elevator, from the tip to approximately butt line (BL) 60, was located 700 feet southeast of the main impact crater. The center section of the left elevator, between approximately BL 33 and BL 60, was located 225 feet north of the main impact crater. The inboard section of the left elevator, between approximately BL 33 and BL 1, was located 490 feet southeast of the main impact crater. The right-hand outboard section of the right elevator, between the tip to BL 60, was located 77 feet south-southwest of the main impact crater. The center section of the right elevator, between BL 33 and BL 60, was located 157 feet southwest of the main impact crater. The inboard section of the right elevator, between BL 33 and BL 1, was located 415 feet south-southwest of the main impact crater. Elevator system control continuity could not be established.

The right flap assembly was separated from the right wing. The right flap actuator measured 2.45 inches. Nominally, 2.0 inches is fully retracted. The left flap was found fragmented throughout the fan distribution and the left flap actuator measured 2.30 inches. This measurement equated to a near fully retracted flap position. The flap interconnect cable continuity could not be established.

The right spoiler panel and actuator were attached to the right wing. The right spoiler actuator measured approximately 0.79 inch. According to Learjet, this measurement equated to a down spoiler actuator. The left spoiler was located at the accident site and the actuator measured approximately 0.82 inch. This measurement also equated to a down spoiler actuator. It should be noted that with the loss of hydraulic pressure, the spoilers could be blown to the down position.

The nose landing gear and both main landing gear were located at the accident site. The nose landing gear and main landing gear actuators were found in the retracted position.

No significant portions of the cockpit were recovered; therefore, no cockpit readings were available.

The engines were both located within the crater near the top, west side of the crater. The engine cowlings and nacelles were found distributed on the north side of the impact crater.

On February 27 and 28, 2003, the NTSB, along with representatives of Learjet, re-examined the wreckage at the salvage facility located in Lancaster, Texas. The wing fuel flapper valves were located and were found to be intact. What remained of the flight control cables were examined with no anomalies noted. All cable separation points displayed frayed ends with a broom-strawed appearance. The right aileron bellcrank remained intact and attached in its proper position. The bellcrank displayed no signs of damage to its stops and both cable-ends remained attached. The left aileron bellcrank was found separated into two pieces, with its separation surface displaying deformities and impact imprints. The aileron trim actuator was

examined, and the position of the shaft and attached bellcrank indicated it was in the neutral position. The main hydraulic accumulator was found punctured through.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed by the Office of the Medical Examiner of El Paso County. The cause of death for both pilots was determined to be "multiple blunt force injuries,"

resulting from an aircraft accident. Toxicological testing was performed by the FAA's Civil Aeromedical Institute of Oklahoma City, Oklahoma. Test results for both occupants revealed that no ethanol or drugs were detected in muscle tissue.

TESTS AND RESEARCH

Speech Examination Study

The NTSB's Vehicle Recorders Lab conducted a speech examination study on the radio transmissions recorded by air traffic control. The pilot's radio transmissions were examined for differences in the final radio transmission when compared to earlier radio transmissions that might indicate changes in the pilot's psychological state relevant to the accident sequence. The NTSB examined all 13 radio transmissions made by the accident pilot during the accident flight. The audio laboratory derived evidence for each statement on seven speech measures associated with psychological state. They were:

- Response time to controller,

- Fundamental frequency (pitch),

- Speaking rate,

- Voice onset time (VOT) articulation,

- Articulation of "r" in wording,

- Mistakes,

- Subjective impressions.

The NTSB audio laboratory prepared digital copies of the recorded transmissions sampled at 20KHz. For each laboratory analysis, each transmission was analyzed through the Entropic Signal Processing System for a computer-generated measure of fundamental frequency (Entropic Research Laboratory, Inc., Washington, DC). The results of the study were as follows (the following "norms" were gleaned from previous NTSB investigations and sections published in Nature, Methods and Metrics of Voice Communications, and Aviation, Space, Environmental Medicine):

- Response time to controller. A measurement, in seconds, was made from the moment the controller stopped speaking until the moment the pilot began. According to Aviation, Space, and Environmental Medicine, routine communications often show respnse times that are less than two seconds, and slower response times can be a sign of distraction or impairment. The pilot responded eight times to the controller with response times ranging from 0.944 to 2.112 seconds. The final transmission was associated with the slowest response.

- Fundamental frequency. The physical property of speech that is perceived as "pitch," often increases when a speaker experiences psychological stress and/or increased workload. The pilot showed an average fundamental frequency of 142.45 Hz during the pronouncement of his

call sign (Turbodog) and 114.69 Hz during the remainder of his responses. The fundamental frequency values for the final transmission were slightly below the mean for the call sign and above, but near, the mean for the entire response.

- Speaking rate. Evidence has shown that a speaking rate may increase when a speaker experiences psychological stress and/or increased workload, and alternately, may slow when a speaker is impaired by hypoxia, alcohol, or other factors. The pilot's speaking rate was measured in syllables per second. The speaking rate for the entire transmission ranged from 4.01 to 6.15 syllables per second. The final transmission showed one of the slower speaking rates.

- VOT time. Speaker impairment by hypoxia or other factors may be evidenced by degraded articulation as a result of changes in VOT. The VOT in the last transmission fell within the range of the average time.

- Articulation of "r". Impairment of a speaker can be indicated by the degraded articulation of the sound "r". Two independent investigators judged the pilot's articulation of the "r" sound in the call sign "Turbo Dog." The raters were unable to reach agreement in most statements.

- Mistakes. Mistakes in communication can be another sign of impairment or distraction. It was noted that the pilot gave an incorrect readback in his final transmission, mistakenly stating "nineteen five" when repeating his new radio clearance of "one one niner point one five." In addition, there was a two syllable unintelligible word that followed the frequency readback. This was the pilot's only mistaken readback out of the five number clearances.

- Subjective impressions. The two independent investigators characterized the pilot's last statement as not sounding distressed and not providing any obvious sense of impairment in thinking.

The overall observations collected during the speech examination study indicated there were no dramatic speech changes when compared to earlier transmissions. However, there was a suggestion of possible subtle differences: the pilot was a little slower at responding to the controller, spoke somewhat slowly, and provided an incorrect readback. The reason for the differences could not be determined from the available data.

Sound Spectrum Study

The NTSB's Vehicle Recorders Division also conducted a sound spectrum study in an attempt to identify background sound signatures that could be associated with the aircraft. The frequency response of the pilot's headset, the aircraft's radios and the Albuquerque ARTCC recoding system were such that background sound signatures associated with the aircraft's systems or engines were not recorded during the majority of transmissions identified from N997TD. During the final transmission, which involved the misread frequency clearance, a short duration signal is evident in the pause between the last intelligible word and the unintelligible word. The signal's frequency is 1680 Hz and was 0.1 seconds in duration, and was contained within a pause lasting 0.25 seconds. There are only two systems in the Learjet 24D that have aural warnings within that range:

Cabin Altitude Warning - an increasing frequency, repeated tone, which increases 700 Hz within a range of 1680 to 3360 Hz (+/- 10%), every 0.3 seconds (+/- 0.06 seconds).

Overspeed Warning - an increasing frequency, repeated tone, which increases 900 Hz within a range of 1900 to 3000 Hz (+/- 20%), every 1.5 seconds (+/- 0.3 seconds).

Because of the short duration of the signal, it was not possible to clearly identify its source. It is also possible that neither aircraft warning system generated the signal. It should be noted that both systems were destroyed during the accident sequence.

Aircraft Performance Data

Learjet's aerodynamics engineering group plotted the aircraft's performance data based on radar data provided by the FAA, aircraft performance specifications, weight and balance information provided by the operator, and winds aloft data obtained from a weather balloon located over Santa Teresa, New Mexico, at 1700 (approximately 1 hour and 21 minutes prior to the accident). Santa Teresa is located 58 nautical miles west-northwest of the accident site.

It should be noted that the radar data provided an indication of the airplane's true ground speed only. In addition, Learjet's performance data were adjusted to a one second interval time-frame; the zero reference being 0000 UTC (1700 MST)

Review of the communication recordings revealed the pilot made the last radio call (which included the incorrect frequency readback, the unintelligible word, and the 0.1 second unidentified signal), just prior to the high rate descent; or 4,871 seconds after 0000 UTC. According to the performance data, approximately 4,855 seconds after 0000 UTC, the airplane's calibrated airspeed (zero wind conditions) exceeded 300 knots, and continued to increase to approximately 310 knots. The airplane then entered a rapid descent (approximately 42,000 feet/minute) approximately 4,887 seconds after 0000 UTC.

As an airplane approaches the speed of sound, shockwaves will form and transonic effects, such as drag rise, buffet, longitudinal stability changes also known as "Mach tuck", and control surface "buzz" begin to develop. Different techniques have been developed to delay the formation of shockwaves and transonic effects, such as wing sweep, thin airfoils, the addition of vortex generators, and/or boundary layer energizers. The accident airplane utilized vortex generators in conjunction with the airplane's thin airfoils.

Mach tuck is a term used to describe a nose down pitch tendency in the transonic speed range (0.75-1.20 Mach). According to Aerodynamics for Naval Aviators (NAVWEPS 00-80T-80), when airflow separation occurs on the wing due to shockwave formation, there is a loss of lift and subsequent loss of downwash aft of the affected area. If the shock induced separation occurs symmetrically near the wing root, a decrease in downwash behind this area is a corollary of the loss of lift. A decrease in downwash on the horizontal tail will create a diving moment and the aircraft will "tuck under." Some aircraft, including Learjets, utilize a stick puller system, which will cause the aircraft to climb in the event of an overspeed.

The accident aircraft's maximum operating speeds, Vmo or Mmo, are 305 KIAS or 0.82 Mach indicated (300 KCAS or 0.81 Mach calibrated). According to Learjet, they have flown the airplane to speeds up to 400 knots calibrated without experiencing extreme flight diversions. In addition, the control force required to recover at 0.86 Mach calibrated is only about 25 pounds. In addition, the Lear 24 series aircraft Mach tuck characteristics were described as "very mild." The accident airplane was equipped with a stick puller that raises the nose at 306 KIAS below 30,000 feet and 0.82 Mach above 32,000 feet. The accident airplane incorporated a sweep equating to 13 degrees at 25% wing cord.

ADDITIONAL INFORMATION

The airplane was released to the registered owner's representative on March 24, 2003.

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial	**Age:**	63, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	09/11/2001
Occupational Pilot:		**Last Flight Review or Equivalent:**	06/08/2001
Flight Time:	20000 hours (Total, all aircraft)		

Co-Pilot Information

Certificate:	Commercial	**Age:**	34, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	06/26/2001
Occupational Pilot:		**Last Flight Review or Equivalent:**	07/11/2001
Flight Time:	1400 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Gates Learjet	**Registration:**	N997TD
Model/Series:	24D	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	247
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	09/10/2001, AAIP	**Certified Max Gross Wt.:**	13800 lbs
Time Since Last Inspection:	202.7 Hours	**Engines:**	2 Turbo Jet
Airframe Total Time:	7966.4 Hours at time of accident	**Engine Manufacturer:**	General Electric
ELT:	Not installed	**Engine Model/Series:**	CJ610-6
Registered Owner:		**Rated Power:**	2950 lbs
Operator:	Air Cargo Express Inc.	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:	N/A	**Operator Designator Code:**	X5CA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night
Observation Facility, Elevation:	ELP, 3958 ft msl	**Distance from Accident Site:**	
Observation Time:	1751 MST	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 25000 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.75 inches Hg	**Temperature/Dew Point:**	11°C / -1°C
Precipitation and Obscuration:			
Departure Point:	Harlingen, TX (HRL)	**Type of Flight Plan Filed:**	IFR
Destination:	El Paso, TX (ELP)	**Type of Clearance:**	IFR
Departure Time:	1800 CST	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	31.533333, -105.625833

Administrative Information

Investigator In Charge (IIC):	Jason A Ragogna	**Report Date:**	04/28/2004
Additional Participating Persons:	Jim B Tidball; Learjet Inc.; Wichita, KS Mark C Spatz; Air Cargo Express, Inc.; Fort Wayne, IN J.D. Huss; ABQ FAA-FSDO; Albuquerque, NM Robert A Radtke; ABQ FAA-FSDO; Albuquerque, NM		
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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		