National Transportation Safety Board
Aviation Accident Final Report

Location:	North Las Vegas, NV	**Accident Number:**	DCA04MA049
Date & Time:	05/27/2004, 1557 PDT	**Registration:**	N5010X
Aircraft:	Raytheon Corporate Jets 390 Premier I	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

The airplane overran the runway after landing on runway 7. The passenger stated that he felt that the approach was "fast" and that the pilot was "behind the power curve" because of high minimum en route altitudes in the area and that they had to "hustle down" during the descent. The passenger indicated that the flight crossed the runway threshold "maybe a bit more" that 10 knots above Vref and touched down about 10 knots above Vref. He said it was not a stabilized approach. Landing distance calculations and other evidence suggest that the lift dump panels did not extend after landing; however, the investigation did not determine the reason(s) for the lack of lift dump. No evidence was found of any failures affecting the lift dump or braking systems. Evidence and interview statements reveal that the pilot flew an unstabilized approach to the runway and landed well above target speed. The high landing speed was result of the pilot's excessive airspeed on the approach and a tailwind component of about 8 knots. Although the pilot landed the airplane within the touchdown area, the airplane's speed upon touchdown was about 17 knots above the prescribed speed. The flight's unstabilized approach and excessive speed should have prompted the pilot to initiate a missed approach.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight's unstabilized approach and excessive speed. Contributing to the excessive touchdown speed was the presence of a tailwind at landing.

Findings

Occurrence #1: OVERRUN
Phase of Operation: LANDING - ROLL

Findings
1. (F) WEATHER CONDITION - TAILWIND
2. (C) AIRSPEED - EXCESSIVE - PILOT IN COMMAND
3. (C) CONTINUED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On May 27, 2004, at approximately 1557 Pacific Daylight Time, a Raytheon Model 390 "Premier I" (N5010X) overran the runway after landing on runway 7 at North Las Vegas Airport, Nevada (VGT). Visual meteorological conditions prevailed for the Part 91 flight from Palm Springs, California to VGT. The pilot and passenger were not injured. (The passenger was an airline transport pilot seated in the right cockpit seat.) The airplane sustained substantial damage.

The following information was obtained from air traffic control (ATC) and cockpit voice recorder (CVR) transcripts. At 1546, automatic terminal information service (ATIS) information for VGT indicated that the wind was variable at 100 deg to 160 deg, at a velocity of 10 to 12 knots. At 1551, the flight contacted approach control and was told to expect runway 12L. The pilot and passenger discussed the wind direction and decided to contact ATC and request to land on runway 7. ATC cleared the flight for a visual approach to runway 7, which is 5,004 feet long.

The tower controller cautioned the flight about a "dust devil crossing the approach end of runway seven" and a minute later stated that it was now north of the field. He also informed the flight that winds were now variable from 140 deg to 200 deg at 12 knots gusting to 18 knots. The pilot asked the passenger "whattdya think?" The passenger responded, "well we are a little ah high.....but we are fast [sound of laughter]."

The pilot stated that he was high and fast during the descent but that the approach was "stable" by 500 feet. He stated that he maintained his Vref speed of 112 knots from there until touchdown.

The passenger stated that he felt that the approach was "fast" and that the pilot was "behind the power curve" because of high minimum enroute altitudes in the area and that they had to "hustle down" during the descent. The passenger indicated that the flight crossed the runway threshold "maybe a bit more" that 10 knots above Vref and touched down about 10 knots above Vref. He said it was not a stabilized approach.

At 1556:20, just after the airplane descended through about 500 feet, the ground proximity warning system (GPWS) announced, "sink rate, pull up,....pull up." The passenger stated, "ref and twenty," and the pilot stated "slowing". This was followed by a GPWS alert of "sink rate, sink rate" at 1556:35. The airplane touched town around 1556:40.

One of the controllers who observed the flight stated that the airplane touched down about 900 feet down the runway and that the airplane landed "hot". After touchdown, the pilot stated that he activated the lift-dump switch but he could not recall if he heard the lift-dump devices extend or if he "felt" the deceleration he was accustomed to as the devices extend. He stated that he did not recycle the lift-dump switch but "held it back" throughout the rollout. He stated he was not initially concerned about the lift dump devices because his training had shown that the brakes would stop the airplane even if the lift-dump devices did not extend. The passenger did not recall if the lift-dump devices were extended upon touchdown. The lift-dump switch was out of his view and he did not see if the pilot activated the switch. The controllers stated that they did not see the spoilers deploy and that the airplane did not appear to decelerate after landing.

As the airplane rolled out, the passenger stated he did not feel any deceleration. He called out for "brakes," and the pilot responded, "yea I'm standin on 'em." The passenger then suggested a go-around but the pilot responded, "I can't." Several seconds later, the CVR recorded sounds similar to increasing then decreasing engine noise. After exiting the end of runway 7, the airplane continued and impacted a perimeter fence and came to rest approximately 735 feet beyond the end of runway. The CVR recording ended at 1557:10.

There were no injuries to the pilot or the passenger.

PERSONNEL INFORMATION

The pilot was issued an Airline Transport Pilot certificate on June 7, 2002. He was type-rated in the Cessna Citation 500 and the Learjet. He stated that he had a previous accident while flying a floatplane in 1992 when it experienced wind shear while landing and landed hard; there were no injuries. Before his job flying the Premier jet, the pilot flew as a first officer on MD-80 and B-757 airplanes. He had about 9,200 total flight hours, of which 62 hours were in the Premier. He had flown into VGT about 30 times.

The passenger was a pilot and check airman on the A-320 at Ryan International Airlines. He had been employed at Ryan International for about six years and had been a captain at Ryan since 1999. He was also type-rated on the Citation 500, which he previously flew as a charter pilot. He was not trained on the Premier.

AIRCRAFT INFORMATION

The Premier was certified under Code of Federal Regulations (CFR) Part 23 for single-pilot operations. The airplane's weight and center of gravity at the time of landing were within the acceptable range. The airplane was equipped with a cockpit voice recorder, which was successfully downloaded. There was no requirement for a flight data recorder, and none was installed.

The Premier spoiler system provides a lift dump function on the ground to reduce roll out and braking distances and utilizes the three spoiler panels on each wing (inboard, middle, and outboard) for lift dump. A lift dump actuator controls the spoiler panels and has only two positions: retracted and extended. A spoiler control unit (SCU) monitors system inputs and controls all functions of the spoiler control system.

The accident airplane was equipped with the original Premier lift dump system. This lift dump system is activated via a switch on the center pedestal. It is spring-loaded to the neutral position and must be held in the extend position until actuation has occurred. In addition to activating the switch, deployment of the lift dump requires that the engine thrust levers be in the idle position and that the weight-on-wheels switches on the nose landing gear and on one of the main landing gear be in the "ground" position. There is no indication in the cockpit of lift-dump extension.

As a result of previous accidents in which the lift dump spoilers failed to deploy after landing, the FAA issued AD 2003-07-09. The AD required that landing distance calculations on the Premier be increased by a factor of 1.53, which represents the airplane's landing performance without the benefits of lift dump activation. Raytheon subsequently issued Service Bulletin (SB) 27-3608 to modify the original lift dump system. Incorporation of SB 27-3608 allowed removal of the landing performance restrictions. The SB modifications had not been incorporated into the accident airplane.

The main brake assemblies had been changed on April 22, 2004. No brake-related discrepancies were recorded following the brake change. No write-ups involving the lift dump system were noted during review of the maintenance records.

WRECKAGE AND IMPACT INFORMATION

Post-accident documentation revealed that the fuselage and wing remained intact and attached. Portions of the nose landing gear structure had separated from the fuselage, and the main landing gear struts had pushed up through the top of the wing. The lift dump panels had mostly separated from their inboard wing attachments; however, examination of available wreckage indicated that the spoilers were still locked in place by the down-lock hook.

The tires were in good condition, with visible tread and no flat spots. Movement of the cockpit flight controls resulted in movement of the elevator, rudder, and ailerons. Flap actuator measurements corresponded to a flap extension of about 20 degrees. Post-accident examination of the brake assemblies indicated that the brakes were in good condition and displayed no unusual signs of wear or excessive heating. The anti-skid system passed all functional checks and no anomalies were found. The spoiler control unit also successfully passed an acceptance test after the accident.

Evidence of runway marks associated with the accident airplane began about 650 feet from the end the runway. (It was not possible to discriminate any earlier runway marks from the airplane due to the amount of other tire tread residue and marks on the runway.) The tracks were continuous into the overrun area for runway 7. The tire marks were consistent with rubber deposits from heavy braking. The marks continued into the sand beyond the runway. The airplane impacted an airport chain-link fence about 460 feet from the end of the runway overrun and came to rest about 275 feet beyond the fence and slightly left of the extended centerline.

METEROLOGICAL INFORMATION

The weather report issued at 1553 for VGT indicated winds from 160 degrees at 15 knots, gusting to 20 knots. A subsequent weather report issued for VGT indicated that a wind shift occurred four minutes before the accident. (A wind shift is defined as wind direction that changes by 45 degrees or more in less than 15 minutes and the wind speed is 10 knots or more throughout the wind shift. It is based on a comparison of the current 10-minute wind average with the 10-minute wind average from the prior 15 minutes.) The current ATIS indicated that runway 12L was in use and that "landing and departing runways one two left and runway seven, other runways may be utilized depending on wind...."

TESTS AND RESEARCH

The airplane's EGPWS unit is designed to record various flight parameters if any of its alerting modes is triggered. The unit was brought to the manufacturer for examination and readout. According to the data captured by the EGPWS system, the aircraft was traveling at approximately 135 knots true airspeed (KTAS) as it descended through 50 feet and was at approximately 125 KTAS near touchdown. The data indicated that a 7.5knot tailwind prevailed at touchdown.

ADDITIONAL INFORMATION

In June 2004, Raytheon issued Safety Communiqué No. 246, applicable to Model 390 Premier I airplanes and titled "Landing Performance Awareness." The communiqué stated that it was being issued to "remind owners and operators of the importance of strictly following Airplane Flight Manual (AFM) procedures during approach and landing." The communiqué noted that the landing distance represents the maximum performance landing capability of the Premier and, according to Raytheon, assumes that touchdown occurs 6-7 knots below Vref as a result of airspeed bleed-off during the flare. The communiqué also noted that the landing distance increases by 120 feet for every knot above Vref.

Landing distance calculations performed by Raytheon indicated, based on the conditions for the accident flight, that Vref should have been 112 knots, which would have resulted in an expected touchdown speed of about 106 knots. The last EGPWS-recorded airspeed of 125 knots would therefore be 19 knots above the expected touchdown speed. A landing speed of 123 knots was used for the landing distance calculations since the airplane had not touched down at the time of the last EGPWS data. A touch down at this speed results in a value about 17 knots higher than would be expected.

Using the Premier's AFM landing distance graphs for 17 knots greater airspeed, the required total landing distance with lift dump would have been about 4,350 feet. At this airspeed but without lift dump yields a required total landing distance of about 6,200 feet. Under these same conditions but with a touchdown about 800 feet down the runway (as reported by several witnesses) yields a required total landing distance of about 5,500 feet, almost 500 feet greater than the runway length.

Pilot Information

Certificate:	Airline Transport	**Age:**	45, Male
Airplane Rating(s):		**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:	Class 1	**Last Medical Exam:**	08/01/2003
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	9200 hours (Total, all aircraft), 40 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Raytheon Corporate Jets	**Registration:**	N5010X
Model/Series:	390 Premier I	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	RB-10
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Turbo Fan
Airframe Total Time:		**Engine Manufacturer:**	Williams Rolls
ELT:		**Engine Model/Series:**	FJ44-2A
Registered Owner:	Raytheon Aircraft Company	**Rated Power:**	2300 lbs
Operator:	390 LLC	**Air Carrier Operating Certificate:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:		**Observation Time:**	
Distance from Accident Site:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Temperature/Dew Point:**	35°C / 8°C
Lowest Ceiling:	Indefinite (V V)	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	15 knots/ 20 knots, Variable	**Visibility (RVR):**	
Altimeter Setting:	29.81 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	PALM SPRINGS, CA (PSP)	**Type of Flight Plan Filed:**	
Destination:	North Las Vegas, NV	**Type of Clearance:**	
Departure Time:	1510 PDT	**Type of Airspace:**	

Airport Information

Airport:	NORTH LAS VEGAS AIR TERMINAL (VGT)	**Runway Surface Type:**	Asphalt
Airport Elevation:		**Runway Surface Condition:**	Dry
Runway Used:	07	**IFR Approach:**	Visual
Runway Length/Width:	5004 ft / 75 ft	**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	Frank Hilldrup	**Adopted Date:**	02/02/2007
Additional Participating Persons:			
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/.		