National Transportation Safety Board
Aviation Accident Final Report

Location:	RALEIGH, NC	**Accident Number:**	ATL96LA073
Date & Time:	04/01/1996, 1004 EST	**Registration:**	N999TF
Aircraft:	Canadair CL-600S	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	9 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

During an instrument landing system (ILS) approach the airline transport pilot noticed a discrepancy in the landing gear indicators. He raised the landing gear and lowered it again. The main landing gear indicator lights were illuminated, indicating that the main gear was extended and locked, but the nose gear light was extinguished. The light in the gear handle was off, indicating that the system was functioning properly. The pilot did not use the emergency landing gear extension system. The aircraft was landed, and the nose gear collapsed. Subsequent examination revealed an intermittently operating extend solenoid in the nose gear selector valve.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the flight crew's inadequate emergency procedure in that they did not manually extend the landing gear, as specified in the airplane flight manual. A factor relating to the accident was: the intermittent operation of the extend solenoid in the nose gear selector valve.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: APPROACH

Findings
1. (F) LANDING GEAR,NORMAL RETRACTION/EXTENSION ASSEMBLY - MALFUNCTION
2. LANDING GEAR,NOSE GEAR - NOT ENGAGED
3. (C) GEAR DOWN AND LOCKED - NOT ATTAINED - FLIGHTCREW
4. (C) EMERGENCY PROCEDURE - NOT FOLLOWED - FLIGHTCREW

Occurrence #2: NOSE GEAR COLLAPSED
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Factual Information

On April 1, 1996, about 1004 eastern standard time, Canadair CL-600-1A11, N999TF, nose landing gear collapsed on landing at the Raleigh-Durham Airport, Raleigh, North Carolina. The aircraft was being operated by Pal-Waukee Aviation under the provisions of 14 CFR Part 135 and instrument flight rules. Instrument meteorological conditions existed at the time of the accident, and an instrument flight rules flight plan was in effect. The airline transport pilot, his co-pilot, the cabin attendant, and the six passengers were not injured; the aircraft was substantially damaged. The flight departed Milwaukee, Wisconsin at 0830 the same day.

The pilot stated that when the landing gear was extended, the landing gear position indicating system presented conflicting information regarding the position of the nose landing gear. The landing gear was then raised, and the indicator lights were all extinguished. The gear was again extended. The main gear indicator lights were illuminated, indicating that the main gear was down, but the nose gear light was extinguished. The light in the gear handle was off, indicating that the system was functioning properly. The pilot did not use the emergency landing gear extension system. The aircraft was landed and the nose gear collapsed. The pilot stated that the clouds and visibility precluded any observation of the landing gear by airport tower personnel.

Post accident examination of the nose gear selector valve revealed an intermittently inoperative extend solenoid valve. According to the failure analysis report, the solenoid valve most likely experienced moisture entry. The manufacturer reported that the selector valve was repaired with an upgraded solenoid to preclude recurrence of the failure.

Pilot Information

Certificate:	Airline Transport	**Age:**	37, Male
Airplane Rating(s):	Multi-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	03/26/1996
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	6500 hours (Total, all aircraft), 1014 hours (Total, this make and model), 3750 hours (Pilot In Command, all aircraft), 155 hours (Last 90 days, all aircraft), 53 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Canadair	**Registration:**	N999TF
Model/Series:	CL-600S CL-600S	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	1042
Landing Gear Type:	Retractable - Tricycle	**Seats:**	13
Date/Type of Last Inspection:	01/29/1996, AAIP	**Certified Max Gross Wt.:**	41250 lbs
Time Since Last Inspection:	46 Hours	**Engines:**	2 Turbo Fan
Airframe Total Time:	3395 Hours	**Engine Manufacturer:**	ALLIED SIGNAL
ELT:	Installed, not activated	**Engine Model/Series:**	ALF502L2C
Registered Owner:	U.S. BANCORP LEASING & FINANC.	**Rated Power:**	7500 hp
Operator:	PAL-WAUKEE AVIATION	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:	PRIESTER AVIATION	**Operator Designator Code:**	PRIA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	RDU, 437 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	1022 EST	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	3 Miles
Lowest Ceiling:	Overcast / 300 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	11°C / 12°C
Precipitation and Obscuration:			
Departure Point:	MILWAUKEE, WI (MKE)	**Type of Flight Plan Filed:**	IFR
Destination:	(RDU)	**Type of Clearance:**	IFR
Departure Time:	0830 EST	**Type of Airspace:**	Class C

Airport Information

Airport:	RALEIGH-DURHAM (RDU)	**Runway Surface Type:**	Concrete
Airport Elevation:	436 ft	**Runway Surface Condition:**	Dry
Runway Used:	23R	**IFR Approach:**	ILS
Runway Length/Width:	10000 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	3 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	6 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	9 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	PRESTON E HICKS	**Report Date:**	08/29/1997
Additional Participating Persons:	DENNIS SCARFAEO; NC		
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/.		