



National Transportation Safety Board Aviation Accident Data Summary

Location:	MARIETTA, GA	Accident Number:	ATL93MA055
Date & Time:	02/03/1993, 1327 EST	Registration:	N130X
Aircraft:	LOCKHEED L382E-44K-20	Injuries:	7 Fatal
Flight Conducted Under:	Part 91: General Aviation -		

Analysis

THE ACFT WAS DESIGNED & USED AS THE COMPANY'S ENGINEERING TEST BED. AN EVALUATION OF THE FLY-BY-WIRE RUDDER ACTUATOR & GROUND MINIMUM CONTROL SPEED (VMCG) WAS BEING CONDUCTED. DURING THE FINAL HI-SPEED GROUND TEST RUN, THE ACFT ABRUPTLY VEERED LEFT & BECAME AIRBORNE. IT ENTERED A LEFT TURN, CLIMBED TO ABOUT 250 FT, DEPARTED CONTROLLED FLT & IMPACTED THE GRND. INVESTIGATION REVEALED A DESIGN FEATURE IN THE RUDDER ACTUATOR THAT REMOVES HYD PRESSURE WITHIN THE ACTUATOR IF THE RUDDER POSITION COMMANDED BY THE PILOT EXCEEDED THE ACTUAL RUDDER ACTUATOR POSITION FOR A SPECIFIED TIME, AND THE RUDDER AERODYNAMICALLY TRAILS. THE ACTUATOR PREVIOUSLY DISENGAGED IN FLT. THE COMPANY DID NOT CONDUCT A SYSTEM SAFETY REVIEW OF THE RUDDER BYPASS FEATURE & ITS CONSEQUENCES TO ALL FLT REGIMES, NOR OF THE VMCG TEST. THE FLT TEST PLAN SPECIFIED THAT ENGINE POWER BE RETARDED IF THE RUDDER BECAME INEFFECTIVE. NEITHER PLT HAD RECEIVED TRAINING AS AN EXPERIMENTAL TEST PLT. THE COMPANY ALLOWED EXPERIMENTAL FLT TESTS AT A CONFINED, METROPOLITAN ARPT.

Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: DISENGAGEMENT OF THE RUDDER FLY-BY-WIRE FLIGHT CONTROL SYSTEM RESULTING IN A TOTAL LOSS OF RUDDER CONTROL CAPABILITY WHILE CONDUCTING GROUND MINIMUM CONTROL SPEED TESTS. THE DISENGAGEMENT WAS A RESULT OF THE INADEQUATE DESIGN OF THE RUDDER'S INTEGRATED ACTUATOR PACKAGE BY ITS MANUFACTURER; THE OPERATOR'S INSUFFICIENT SYSTEM SAFETY REVIEW FAILED TO CONSIDER THE CONSEQUENCES OF THE INADEQUATE DESIGN TO ALL OPERATING REGIMES. A FACTOR WHICH CONTRIBUTED TO THE ACCIDENT WAS THE FLIGHT CREW'S LACK OF ENGINEERING FLIGHT TEST TRAINING.

Findings

Occurrence #1: LOSS OF CONTROL - ON GROUND/WATER
Phase of Operation: OTHER

Findings

1. (C) FLT CONTROL SYST, RUDDER CONTROL - INADEQUATE
2. (F) ACFT/EQUIP, INADEQUATE DESIGN - MANUFACTURER
3. (C) INADEQUATE SUBSTANTIATION PROCESS, INSUFF REVIEW - COMPANY/OPERATOR MGMT
4. (C) FLT CONTROL SYST, RUDDER - DISENGAGED

- 5. (C) DIRECTIONAL CONTROL - NOT POSSIBLE - PILOT IN COMMAND
- 6. PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND
- 7. (F) INADEQUATE TRAINING - COMPANY/OPERATOR MANAGEMENT

 Occurrence #2: LOSS OF CONTROL - IN FLIGHT
 Phase of Operation: TAKEOFF - INITIAL CLIMB

- Findings
- 8. LIFT-OFF - PERFORMED - PILOT IN COMMAND
 - 9. (C) AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND
 - 10. STALL/SPIN - INADVERTENT - PILOT IN COMMAND
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
 Phase of Operation: TAKEOFF - INITIAL CLIMB

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Flight Engineer	Age:	42
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	Airplane Multi-engine; Instrument Airplane
Flight Time:	7658 hours (Total, all aircraft), 1260 hours (Total, this make and model), 5276 hours (Pilot In Command, all aircraft), 74 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	LOCKHEED	Registration:	N130X
Model/Series:	L382E-44K-20 L382E-44K-	Engines:	4 Turbo Prop
Operator:	LOCKHEED AERO. SYSTEMS CO.	Engine Manufacturer:	ALLISON
Operating Certificate(s) Held:	None	Engine Model/Series:	501-M71K
Flight Conducted Under:	Part 91: General Aviation -		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	MGE, 1032 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None / 0 ft agl	Wind Speed/Gusts, Direction:	3 knots / , 130°
Temperature:	10° C	Visibility	7 Miles
Precipitation and Obscuration:			
Departure Point:	(MGE)	Destination:	(MGE)

Airport Information

Airport:	DOBBINS AFB (MGE)	Runway Surface Type:	Concrete
Runway Used:	11	Runway Surface Condition:	Dry
Runway Length/Width:	10000 ft / 300 ft		

Wreckage and Impact Information

Crew Injuries:	7 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:			

Administrative Information

Investigator In Charge (IIC):	PRESTON E HICKS	Adopted Date:	03/18/1994
Investigation Docket:	NTSB accident and incident docket 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.nts.gov/pubdms/ .		

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