NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

May 16, 2013

AIRFRAME EXAMINATION

WPR13FA227

This document contains ten embedded photos.

A. ACCIDENT

Location:	McMinnville, Oregon
Date:	May 13, 2013
Aircraft:	Gates Learjet 35A
NTSB IIC:	Eliott Simpson

B. EXAMINATION PARTICIPANTS:

Eliott Simpson
Aviation Accident Investigator
National Transportation Safety Board
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Aviation Safety Inspector
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Portland, Oregon

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Bombardier/Lear
Wichita, Kansas

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Air Safety Investigator
Honeywell Aerospace
Phoenix, Arizona

C. SUMMARY

Examination of the recovered airplane was conducted on May 16 and 17, 2013 at the facilities of Evergreen International Aviation, McMinnville, Oregon.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

Damage

The fuselage remained intact, and sustained damage to the nose landing gear, which had become folded aft. The belly skin just aft of the nose landing gear door was punctured, with corresponding damage to the belly stringers. The forward right fuselage skin surfaces, at the oxygen access door exhibit compression damage, with red-colored longitudinal scrape marks. A six-inch-long gouge was present in the pressure vessel skin, 2-foot below the forward cabin window.

Both wings exhibited four indentations to their leading edges, crushing the leading edges back to the forward spar (Photo 1). The indentations exhibited red transfer markings consistent with the ILS antenna contact. The right wingtip fuel tank sustained crush damage to its outboard skin, with similar transfer marks. The right and left engine sustained 1-inch-wide indentations to their inlet cowlings.

No damage was observed to the remaining sections of the airplane including the flaps, control surfaces and empennage.

Cockpit Controls

Both left foot pedals were in the forward position. All circuit breakers were closed. The battery power switches were turned on, and the thrust reverser indicator lamps were tested utilizing the master light, press to test button. Both the left and right, unlock, deploy, and bleed valve lamps, as well as the emergency stow lamp illuminated.

Squat Switches

Examination of both the left, and right landing gear squat switches revealed that their assemblies had become partially separated from their upper scissor fork pads. All three attachment bolts were loose, and the assemblies had risen between 1/8 and 1/4 inches from their pads (Photo 3, 5, 6). The right squat switch roller bearing surface was not in contact with the scissor arm cam, and the left roller bearing surface was resting lightly against the cam (Photos 4,6). The attachment nuts were loose, and could be unscrewed by hand, with no visible bolt thread present at their crowns (Photos 7,8). The left landing gear nuts were removed; two unscrewed from their associated bolts after about five turns, with one separating after a single turn. Two of the corresponding right landing gear nuts unscrewed after three full turns, with the third after a single turn. All the bolt threads were sharp, with no flattening damage noted to their crests. All nuts exhibited friction and locking action when screwed onto their bolts by hand. The scissor pad and squat assembly mating surfaces were coated in oil, and grime, and were free of rub marks and fretting damage.

Thrust Reversers

The correlation between the thrust lever positions, and engines power lever angle (PLA) potentiometer (visible through the sight window at each fuel controller unit) was examined with all electrical systems turned off.

With the thrust and reverse thrust levers in idle detent, the left engine PLA indicated 19 degrees, with the right 16 degrees.

With the thrust levers in idle detent, and the revers thrust levers in the thrust deploy detent, the left engine PLA indicated 18 degrees, with the right indicating 15.

With the reverse thrust levers pulled back to the bulk solenoid-stop position, the left PLA indicated 42 degrees, with the right 39 degrees (Photo 9).

The bulk solenoid was then disengaged by hand, and the thrust reverse lever was moved back to the full reverse thrust position. Both the left and right PLA indicated 116 degrees (Photo 10)

Emergency Brakes

The emergency brake, emergency air indicator needle was within the green limit, one needle-width below the red line 3,000 psi value (Photo 2). Hydraulic fluid was observed leaking below the damaged nose wheel strut.

The operation of the emergency braking system was performed by activating the emergency brake handle, while observing the movement of the brake pistons, pads, and disks for both wheels. With the emergency lever depressed by two inches, the pads began to move and make contact with their associated disks. The lever was moved up and down to its full 4.5-inch-travel five times. Resistance was felt in the lever, with corresponding movement of the pads and the sound of hissing air. Upon completion, the emergency air gauge had moved to a position between 1,800 and 3,000 psi.

Photo 1 – Leading Edge Damage

Photo 2 – Emergency Air

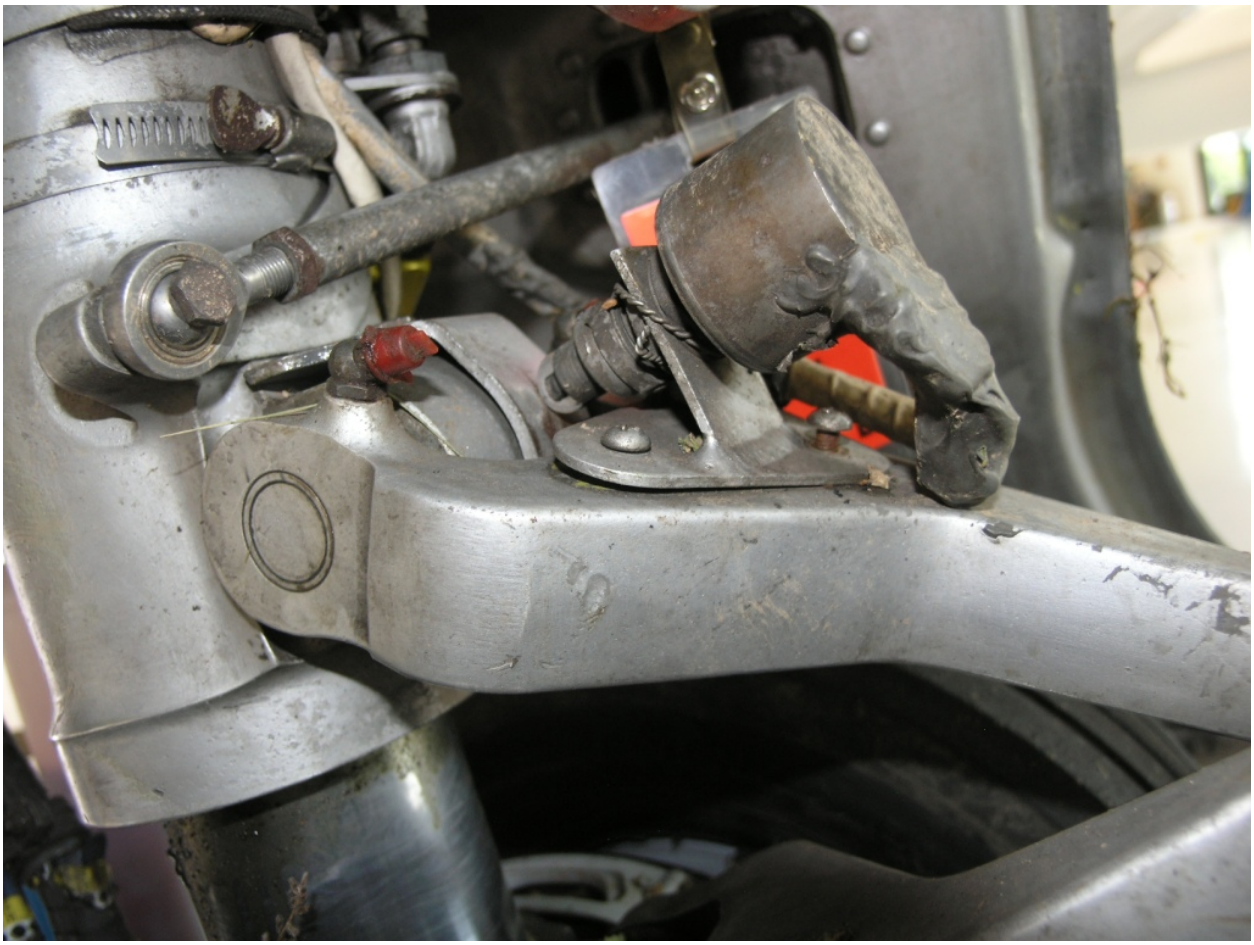

Photo 3 – Left Squat Switch

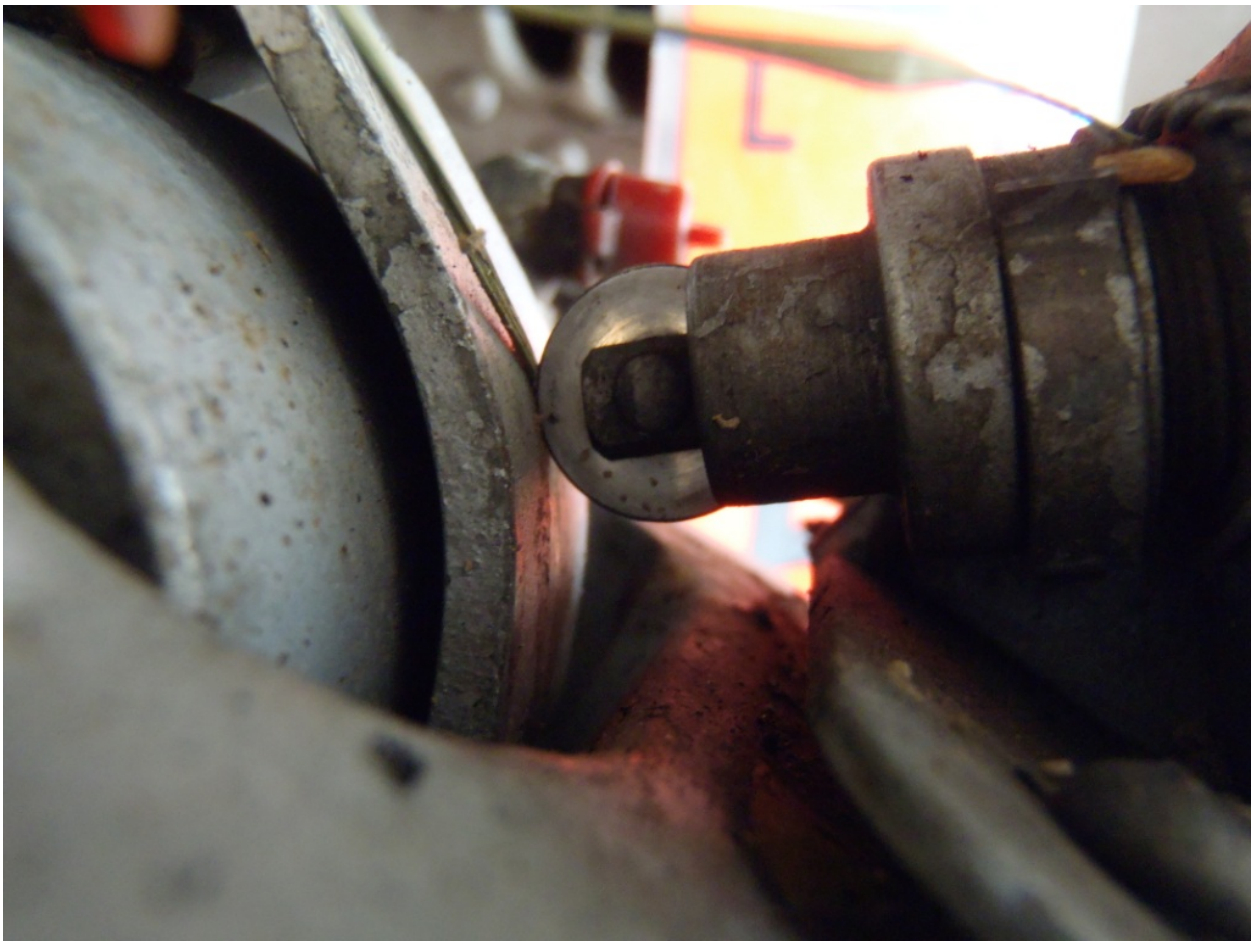

Photo 4 – Left Squat Switch Roller

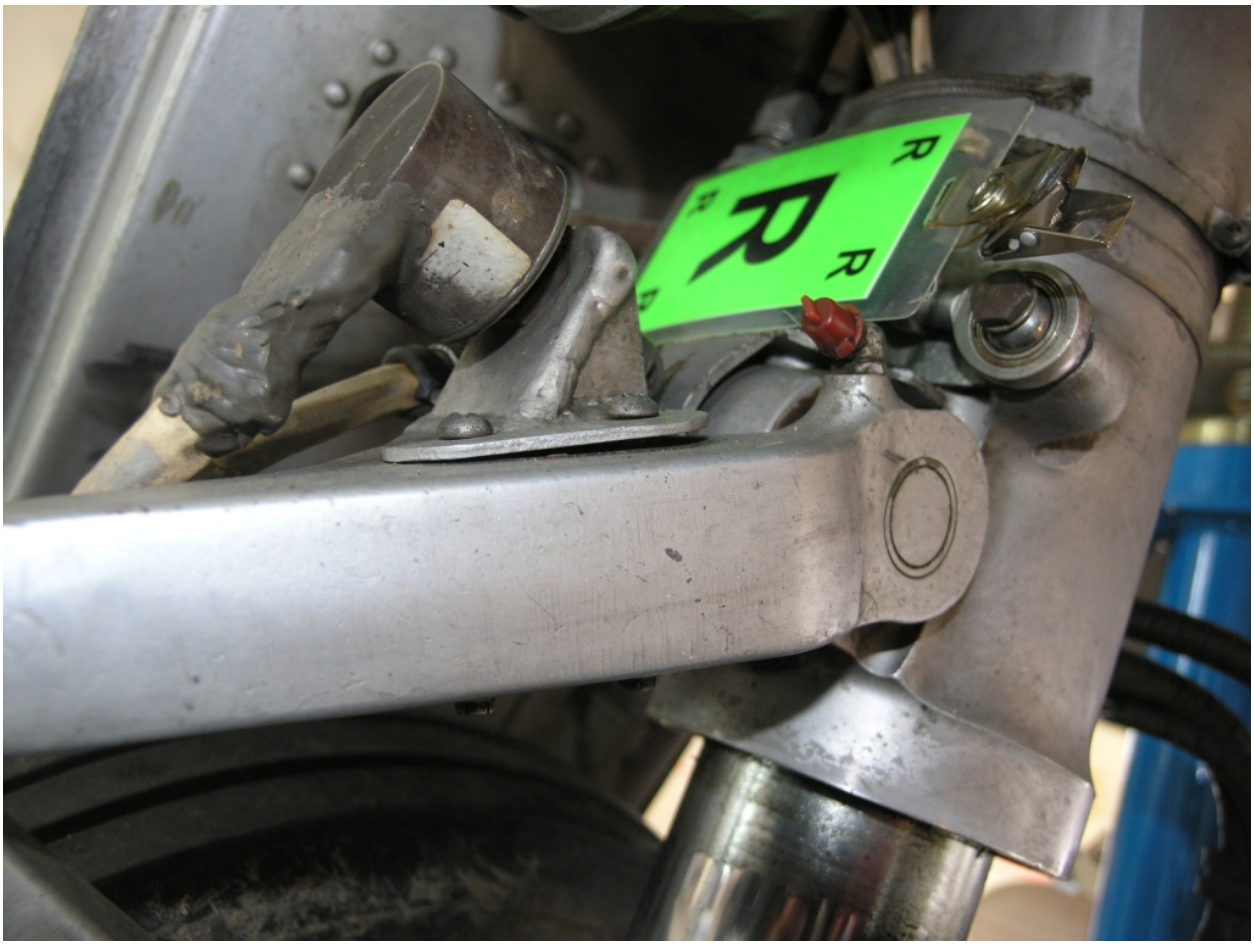

Photo 5- Right Squat Switch

Photo 6 – Right Squat Switch Mounting Screws

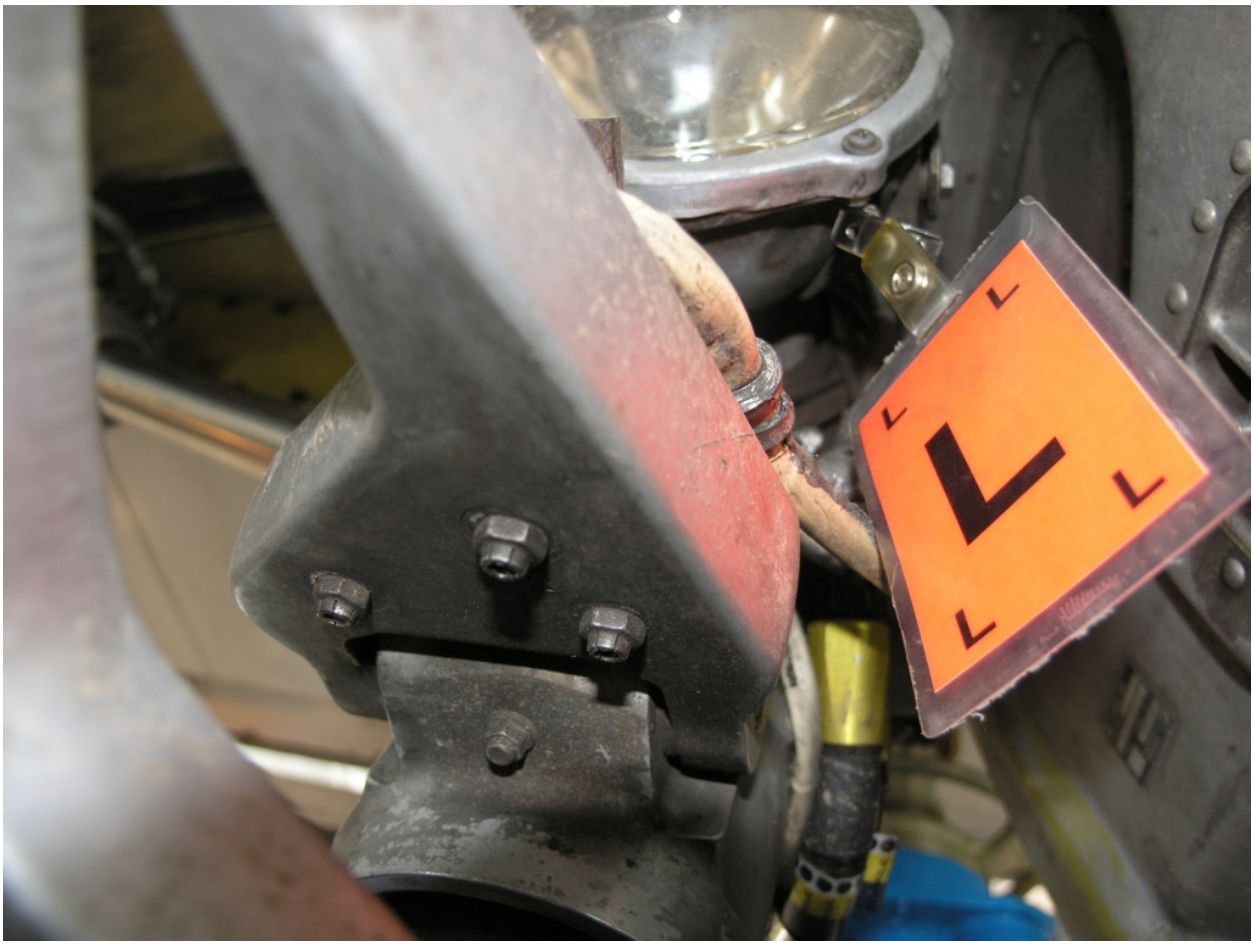

Photo 7 – Left Squat Switch Mounting Nuts

Photo 8 – Right Squat Switch Mounting Nuts

Photo 9 – Thrust Levers with Bulk Solenoid Out

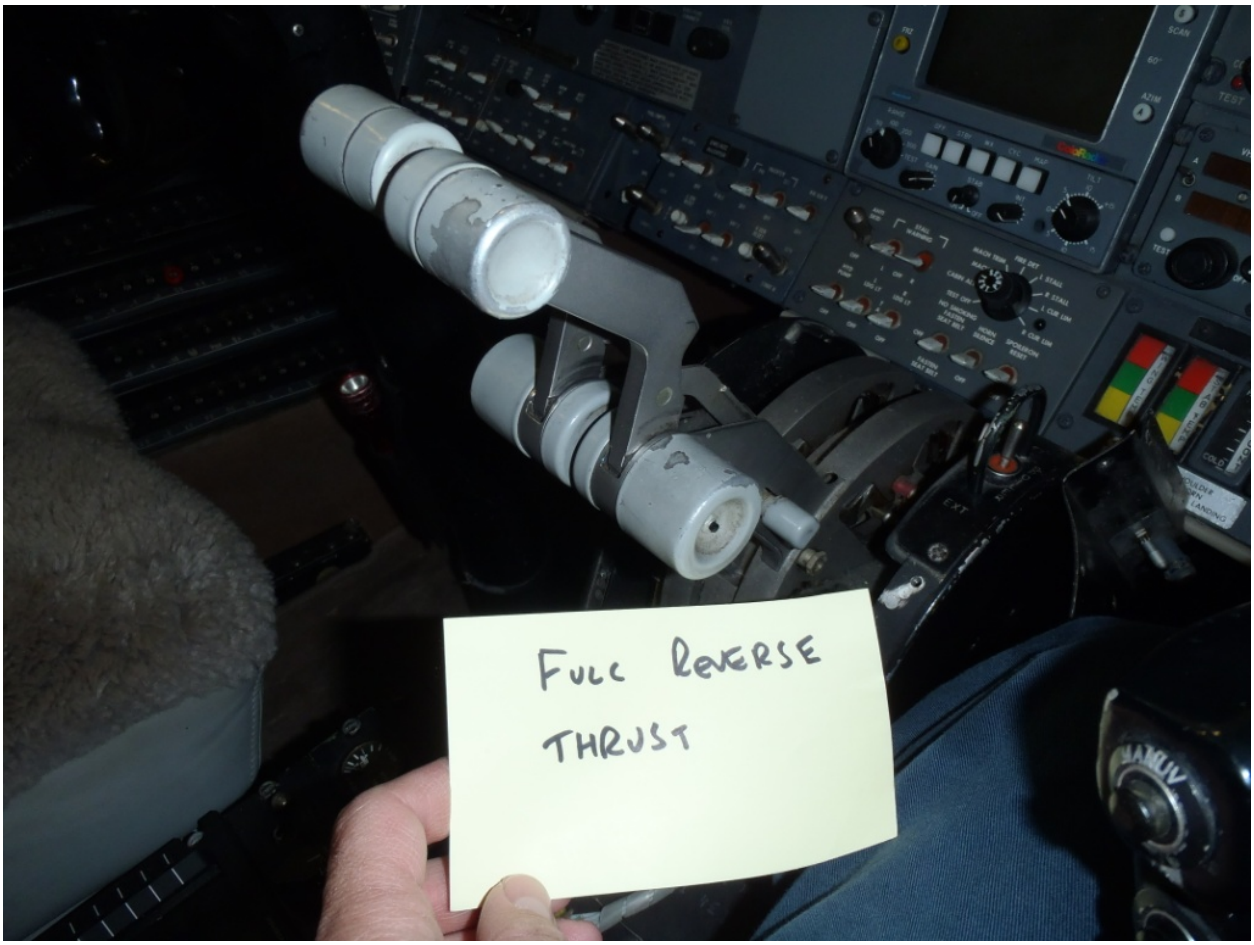

Photo 10 – Thrust Levers in Reverse Position

Submitted by: Eliott Simpson