



ERA19FA049

Gainesville, Georgia

November 17, 2018

Lancair Legacy RG – N8448J

NTSB COMPONENT EXAMINATION REPORT

Control Sticks, Trim Switches, Elevator Trim Tab Servo

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PARTICIPANTS IN THE EXAMINATION

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HISTORY OF FLIGHT

On November 17, 2018, about 1835 eastern standard time, a Lancair Legacy RG, N8448J, was substantially damaged after striking trees and impacting terrain at the Lee Gilmer Memorial Airport (GVL) Gainesville, Georgia. The private pilot was fatally injured, the pilot-rated passenger was seriously injured. Night visual meteorological conditions prevailed, and no flight plan was filed for the personal flight, which was conducted under the provisions of 14 Code of Federal Regulations Part 91. The flight departed Charleston Executive Airport (JZI), Charleston, South Carolina at 1728, destined for GVL.

Several components were removed from the airplane at the salvage facility under remote (video) oversight by the NTSB. The components were shipped to the NTSB office in Ashburn, VA.

COMPONENT INFORMATION

Trim Switches Supplier: Infinity Aerospace (control stick grip manufacturer)
Control Stick Grip Model Number: [custom]
Trim Tab Servo Motor Manufacturer: Ray Allen Co. Inc.
Trim Tab Servo Model: T2-7A

INITIAL EXAMINATION AS RECEIVED

The pilot (left) side 4-way trim switch was undamaged. The copilot (right) side trim switch “china hat” had broken from the switch shaft and was not attached. The hole in the grip surrounding the broken shaft was filled with dirt. The switch shaft was found slightly left of the center of the hole (toward the left roll trim position). The wiring connectors for both control sticks were intact and undamaged.

The elevator trim tab servo was in good condition with its wiring and connector attached. The turnbuckle “push-pull” rod was slightly bent, and was attached to the servo actuator arm.



DETAILED EXAMINATION

Trim Switches

The rear of each connector was removed to identify the proper wire colors and associated connector pins.

For **both** the pilot and copilot trim switches:

With the switches in their “as found” position, no continuity was detected between the ground (black wire, connector pin 7) and any of the pitch or roll trim activation wires, in either direction. That is, no continuity between ground and:

- 1) pitch trim down wire (brown wire, connector pin 6)
- 2) pitch trim up wire (blue wire connector pin 5)
- 3) roll trim left wire (red wire connector pin 8)
- 4) roll trim right wire (green wire, connector pin 9)

The dirt surrounding the trim switch shaft on the copilot (right) side control stick was removed to allow the switch to move.



Copilot (right) control stick grip

For **both** the pilot and copilot trim switches:

- 1) With the trim switch in the “up” position, continuity was detected between the ground (black wire, connector pin 7) and the pitch up wire (blue wire connector pin 5)
- 2) With the trim switch in the “down” position continuity was detected between the ground (black wire, connector pin 7) and the pitch down wire (brown wire, connector pin 6)
- 3) With the trim switch in the “left” position, continuity was detected between the ground (black wire, connector pin 7) and the roll trim left wire (red wire connector pin 8)
- 4) With the trim switch in the “right” position, continuity was detected between the ground (black wire, connector pin 7) and the roll trim right wire (green wire, connector pin 9)

For the copilot (right) trim switch, when moving the broken switch shaft to the left (roll trim left) position, more force was required to detect continuity in the wires than was needed when moving switch to the right, up or down positions.

Continuity was tested at the connector pins in all cases, as shown by example in the figure below.



Elevator Trim Tab Servo Motor

The servo motor actuator arm was marked with white tape before it was removed from the airplane, to note its position as found. When removed, the elevator trim tab was found deflected about 30-35° trailing edge up, relative to the elevator (this direction is airplane nose downward trim). The tape was removed, and the arm was scribed on all sides where it met the servo body, to maintain the reference for the as found position of the arm.

The arm extension, as measured from the servo body to the edge of the shoulder of the connecting tab, was 0.25 inch.



After applying 12VDC to the motor wires at the connector, the arm retracted into the body until it stopped. The arm extension at the “full in” position was measured as 0.15 inch



The voltage polarity was reversed, and the arm extended outward from the body until it stopped. The arm extension at the “full out” position was measured as 0.80 inch.



SUMMARY

The trim switches in both control sticks and the elevator trim tab servo motor functioned as expected during these tests.

FUTURE ACTIVITIES

None planned. The parts were returned to Atlanta Air Salvage, Griffin Georgia,