

National Transportation Safety Board

Office of Aviation Safety

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ANC23FA08

AIRFRAME AND ENGINE EXAMINATION REPORT

January 13, 2023

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A. ACCIDENT

Location: Kaupo, Hawaii
Date: December 15, 2022
Time: 2214 HST
Airplane: Raytheon Aircraft Company C90A

B. AIRFRAME AND ENGINE EXAMINATION REPORT

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C. SUMMARY

On December 15, 2022, about 2114 Hawaii-Aleutian standard time, a Raytheon Aircraft Company (formerly Beech) C90A, twin-engine, turbine-powered airplane, N13GZ, is presumed to have sustained substantial damage when it was involved in an accident near Kaupo, Hawaii. The airline transport pilot, flight paramedic, and flight nurse are presumed fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (CFR) Part 91 air ambulance positioning flight.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

1.1 Fuselage

From the nose to the tail section was impact damaged and compressed upward. The aileron autopilot servo rotated freely when pulling on the aileron cable.

The elevator flight control cables were continuous from the aft elevator bellcrank to the cockpit. Each elevator aft bellcrank push/pull rod tubes were separated. The rod ends remained attached to the bellcrank. The rudder cable is continuous from the tail section to the cockpit. The second rudder cable was not located.

The pilot seat was partially separated. The 4-point restraint was intact, the lap belt portion remained connected and was released to facilitate recovery.



Figure 1 View of the fuselage and wings.

1.2 Empennage

The empennage separated during the accident sequence and was not recovered.

1.3 Wings

Right Wing

The right wing was cut at the fuselage to facilitate recovery. The right wing remained partially attached to fuselage, the top front spar separated, the bottom front spar was cut. The top spar fracture surface was shiny. The top and bottom aft spar were separated. The bottom of right wing showed upward hydraulic compression along the surface.

The right wing leading edges outboard of the engine separated from the wing along the front spar rivets. All wing separations exhibited signatures consistent with tension overload. The outboard right wing remained attached to the inboard section, it was separated outboard of the aileron center hinge about 12 inches. The right wingtip was not recovered

The right inboard flap actuator remained attached to the aft wing spar, but separated from the inboard flap. The right outboard flap actuator separated from its attachment points, only the actuator housing remained attached to the wing. Inboard flap actuator measured to be about 2 inches, which corresponds with 0°, flaps up. The outboard flap remained attached to the inboard and outboard hinges and exhibited impact damage.

The right aileron separated from the right wing and was not recovered. The center hinge remained attached; the outboard hinge was not recovered. The aileron flight control cables were continuous from the cockpit for each respective wing aileron outboard bellcrank with cables separated at each wing root. The right wing aileron bellcrank was separated from the wing but remained attached via control cables.

The fuel bladders were breached. There was hydraulic deformation present on all wing fuel tanks. The right wing fuel tank caps remained installed in their respective fuel tanks.



Figure 2 View of the right wing.

Left Wing

The left wing was cut at the fuselage to facilitate recovery. The outboard left wing remained attached to the inboard/center section. The left wing front and aft spars were cut at the fuselage point. The left wing leading edge was partially separated, the outboard (from just outboard of the engine) section of the inboard wing was not located. The left wing leading edges outboard of the engine were separated from the wing along the front spar rivets. The bottom of left wing showed upward hydraulic compression along the surface.

The left inboard flap was separated, the outboard flap remained attached to the wing. The left flap actuator remained attached to the aft wing spar and was found extended about 2.25 inches, which correlates to about 1°, flap up. The outboard actuator remained attached to the aft wing spar. The outboard flap actuator measured to be about 1.5 inches, which corresponds with 0°, flaps up.

The left aileron separated from the left wing, about 30 inches was recovered. The left aileron trim was about 1 inch, which corresponds to about 2° trailing edge up.

The fuel bladders were breached. There was hydraulic deformation present on all wing fuel tanks. The left wing fuel tank caps remained installed in their respective fuel tanks.



Figure 3 View of the left wing.

1.4 Landing Gear

The right landing gear attachment point remained attached to the wing. Positioning was undetermined. Landing gear actuator remained attached to the wing and drag brace. The actuator appeared to be retracted. The left main landing gear was separated and recovered by the USCG after the accident.

The left landing gear remained attached to the left wing. The oleo and wheel were separated from the trunnion. Positioning was undetermined. The left landing gear actuator remained attached to the wing and drag brace. The actuator appeared to be retracted.



Figure 4 View of left main landing gear recovered by the USCG.

1.5 Cockpit

The elevator trim tab control position was about 3° down. The left throttle control position was in idle position, the right throttle position was about mid-position.

The left propeller lever was pulled back to idle. The right propeller lever was in feather. Mixture controls were full forward (rich). Flap handle was in the UP position. The landing gear handle was in the DOWN position. The instrument panel was pushed forward and down. Rudder trim was FULL LEFT, past normal range. Left and right DC load indicators indicated off scale low. The voltage meter indicated off scale 0. Watts indicated -10. The propeller amp meter indicated 0. Prop frequency was off scale 0. The generator switch indicated (TPL FED).

The artificial horizon was uncaged and banked right and nose high, greater than 45°. Attitude gyro was disassembled, scoring was present on the inside of the gyro housing.

The instrument emergency light switch was found in the OFF position. All the circuit breakers on the lower fuel panel were engaged, except for 5-amp right propeller tach circuit breaker.

Copilot side instruments

The course deviation indicator was impact damaged. CDI deflected to the left, course selected to 035 heading. Lumber white line was set to a heading to 085. Airspeed Vmo (barber pole) indicated 184 knots, the white needle was 95 knots. The altimeter read 2,340 ft, the Klausman window read 29.95, and Mb1014.5.

Pilot side instruments

The airspeed indicated 0, Vmo indicated 226 knots. The ADF/NAV indicator indicated 220°, the VOR needle indicated 180°, the heading bug 120°

The control column was deformed down.

Fuel panel

The left and right firewall shutoff valve switches were found in the OPEN position. The left and right transfer pump override switches were in AUTO. Left and right boost pump switches were on. The fuel quantity nacelle switch was separated. Left and right fuel gauges were past zero. Hobbs meter read: 3788.3.

Overhead light panel

The overhead light panel was impact damaged. The engine instrument, avionics panel, OVHD PED and subpanel knobs were full bright. The side panel knob was separated.

1.6 Fuel/Fuel System

The right fuel bladders were breached. There was hydraulic deformation present on all wing fuel tanks. The right wing fuel tank caps remained installed in their respective fuel tanks.

The left fuel bladders were breached. There was hydraulic deformation present on all wing fuel tanks. The left wing fuel tank caps remained installed in their respective fuel tanks.

1.7 Other Systems

2.0 Engine Examination

No anomalies, contamination, or evidence of malfunction were found in any of the engine accessories. The engines displayed contact signatures to their internal components characteristic of the engines developing power at the time of impact. The examination of the engines revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Right engine

The right engine S/N: PE0198. The 1st stage Compressor blades were intact and seized. The PT blades intact, 10° percent are fractured due to impact crushing of the exhaust case. The exhaust case was crushed, and the exhaust flange was separated at flange "A". The reduction gearbox case was corroded (magnesium) and separated exposing 1st stage reduction gears, all gears present, the teeth were not fractured. 2nd stage reduction gear box, all gears present, the teeth were not fractured.

The gas generator case was split and crushed. The FCU power lever control arm was bent seized. Power lever was at idle position. The FCU condition lever fractured and separated from FCU. The P3 line was intact and dented. There were no rotational signatures on the 1st stage compressor due to sudden impact. The inlet struts were intact. The 2nd stage planetary gears intact. The power lever was at idle.

The engine was borescoped, the compressor turbine blades were intact. Accessory gearbox case was heavily corroded exposing the gear and seized.



Figure 5 View of the right engine.

Left engine

The left engine S/N: PE0033. 40% of the power turbine blades were cracked and midspan from the T/E to L/E and bent in opposite direction of rotation. The inlet struts were intact. The 1st stage compressor blades were intact and seized. No rotational signatures on the 1st stage compressor due to sudden impact. FCU power lever control arm was bent and seized. Power lever was at max position. FCU condition lever was bent. The power lever was at max. The spinner backing plate was deformed forward. The exhaust case was split open in 2 locations, 12 o'clock and 5 o'clock position. The P3 line was crushed and intact. The generator case was buckled from about 3 o'clock position thru the 6 o'clock. The inlet struts were intact. The right side engine mount was twisted.

The engine was boroscoped, the compressor turbine blades were intact. Accessory gearbox was heavily corroded exposing the gears and seized.



Figure 6 View of the left engine.

3.0 Propeller Examination

Right Propeller

Three of the 4 propeller blades were in a flat pitch, almost in feather. The propeller return spring was not located. Propeller governor beta arm, reset rod and beta block were attached to governor. Propeller governor input cable was separated from governor.

Left Propeller

The propeller governor was attached and impacted damaged. The propeller governor beta arm, reset rod and beta block were attached to governor. The propeller blades were in fine pitch. All three propeller blades were bent aft, one blade tip was bent forward. Propeller governor input cable was separated from governor. The propeller return spring was partially separated.

4.0 Aircraft Information

Devices Retained

A Cockpit Voice Recorder (CVR) was installed in the aircraft and was recovered. An Appareo Vision 1000 was installed and recovered. A SkyTrac was installed and recovered. The aircraft was equipped with a Stratus 2S which was recovered. An iPad and iPhone were recovered.

Submitted by:

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