



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Eastern Region

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AIRFRAME AND ENGINE EXAMINATION

ERA21FA229

1.0 EXAMINATION PARTICIPANTS:

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2.0 SUMMARY

Examination of the airframe and engine was conducted on scene and at the facilities of Atlanta Air Recovery on June 3, 2021. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

3.0 DETAILS OF THE INVESTIGATION

Airframe Examination

An examination of the airplane revealed that the entire cockpit and cabin area was destroyed by post-crash fire and impact damage. All flight instruments and control positions were unreliable due to fire and impact damage. Although push pull tubes were fire and impact damaged, flight control continuity was still established from the flight controls in the cockpit to the control surfaces. A review of the maintenance logbooks revealed no anomalies with the airframe that would have precluded normal operation. The wings were destroyed by impact and post-crash fire, although remnants of the wing root structure remained attached to the fuselage. Some parts of the flight control surfaces were observed still connected to the wing structures. Examination of the empennage revealed fire damage, with both the horizontal and vertical stabilizers being attached to the empennage but showing signs of impact and fire damage. Burnt oil streaks were discovered on the right horizontal stabilizer and elevator.

Engine Examination

Examination of the engine revealed it remained partially attached to the airframe on the tubular mount. The engine was displaced aft into the firewall. The engine was removed from the airframe for examination. The crankshaft was rotated using a tool inserted in the vacuum pump drive and continuity of the crankshaft to the rear gears and to the valve train was confirmed. The interiors of the cylinders were observed using a lighted borescope and no anomalies noted.

The engine's accessory section was found to be fire damaged. Components in the accessory section, as well as the oil and fuel lines, also showed signs of fire damage. One of the oil lines from the oil valve was broken at the fitting, but due to the fire damage, it could not be determined if the failure occurred before or after the accident. Notably, fresh oil was observed on broken pieces of the windshield at the wreckage site. A review of a maintenance logbook excerpt revealed that the "Christian oil valve" had been resealed on March 25, 2021. However, the valve was discovered fire damaged. The oil sump was partially consumed in the post-impact fire.

The fuel injector servo remained attached to the engine and was damaged by fire and impact. The fuel flow divider also remained attached to the engine and was damaged by fire. The injector

lines were secure. The top cover of the flow divider was removed, and the rubber diaphragm was observed to be heat damaged. The two-piece fuel injector nozzles were unobstructed.

The engine-driven fuel pump base remained attached to the engine. The pumping section was separated from the base and partially consumed in the fire. No fuel was observed in any of the engine fuel system components or hoses.

Examination of the ignition system revealed that the left magneto remained attached to the engine and was destroyed by fire. The electronic ignition device mounted on the right magneto mounting pad also remained attached and was fire damaged. The ignition harness was destroyed by fire. The upper spark plugs were marked NGK and exhibited a dark gray coloration, indicating normal wear. The lower spark plugs were not removed but exhibited a gray coloration and normal wear condition when observed using a lighted borescope.

Both propeller blades were broken from the hub and found in the impact crater, along with the spinner and pieces of the nose cone. The propeller governor was separated from the engine and partially consumed in the post-impact fire.