NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

July 15, 2014

AIRFRAME AND ENGINE EXAMINATION

WPR14LA272

This document contains 12 embedded photos.

A. ACCIDENT

Location:	Dietrich, ID
Date:	June 29, 2014
Aircraft:	Aerospatiale AS350B2, Registration Number: N3540CL, Serial #: 232
NTSB IIC:	Howard Plagens

B. EXAMINATION PARTICIPANTS:

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C. SUMMARY

Examination of the recovered airframe and engine was conducted on July 15, 2014, at the facilities of Air Transport, Phoenix, Arizona. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

Photo 1Airframe Dataplate

1.0 Airframe Examination

The hour meter read 0090.9 hours.

Cabin

The nose and cabin area were severely crushed and deformed. The windows separated in multiple pieces above the floorboard.

Photo 2 Left Side of Airframe

The “Hyde test” switch on the 30 alpha switch panel was guarded, and in the” not activated” position.

The forward two cabin seats separated from the floorboards at their composite foot structure. The rear seats remained attached to the aft wall and floor. The restraint system was four-point harnesses.

Photo 3 Front View of Cabin Area

The fuel tank remained in the center of the fuselage, and was leaking fuel at one of the two fuel pumps. The cooling/demisting valves position could not be determined due to impact damage.

The forward left and right cross tube was broken at the fuselage. The aft cross tube was broken at the skids. Both skids fractured and separated in multiple locations

There was an estimated 60 pounds (50 pound weight and forklift wheel) of ballast observed in the aft cargo hold.

An external camera that was attached to the nose of the ship separated from the airframe.

Flight Control System

Flight control system continuity was confirmed from the forward cabin input devices to their respective end destinations.

All push-pull tubes under the floorboard to the transmission deck fractured and separated. The fracture surfaces were angular and jagged.

Only single pilot controls were installed, and were on the right side. The pilot's pedals were jammed under the floorboard, and could not be moved; the left pedal was bent down and forward.

Photo 4 Flight Controls and Instrument Panel

The cyclic control moved, but was tight. The friction level was not marked, but (assuming an arbitrary scale of 1-5, least to most) the friction level was estimated at a level 4.

The collective was tightened down to an estimated level 3 (assuming an arbitrary scale of 1-5, least to most)

The yaw servo isolation switch on the collective was in the OFF (aft) position, and the guard was broken.

Fuel System

The fuel control lever in the cockpit was in the FLT position. The fuel shutoff lever located in the cockpit was in the FUEL ON position. HONEYWELL PHOTO

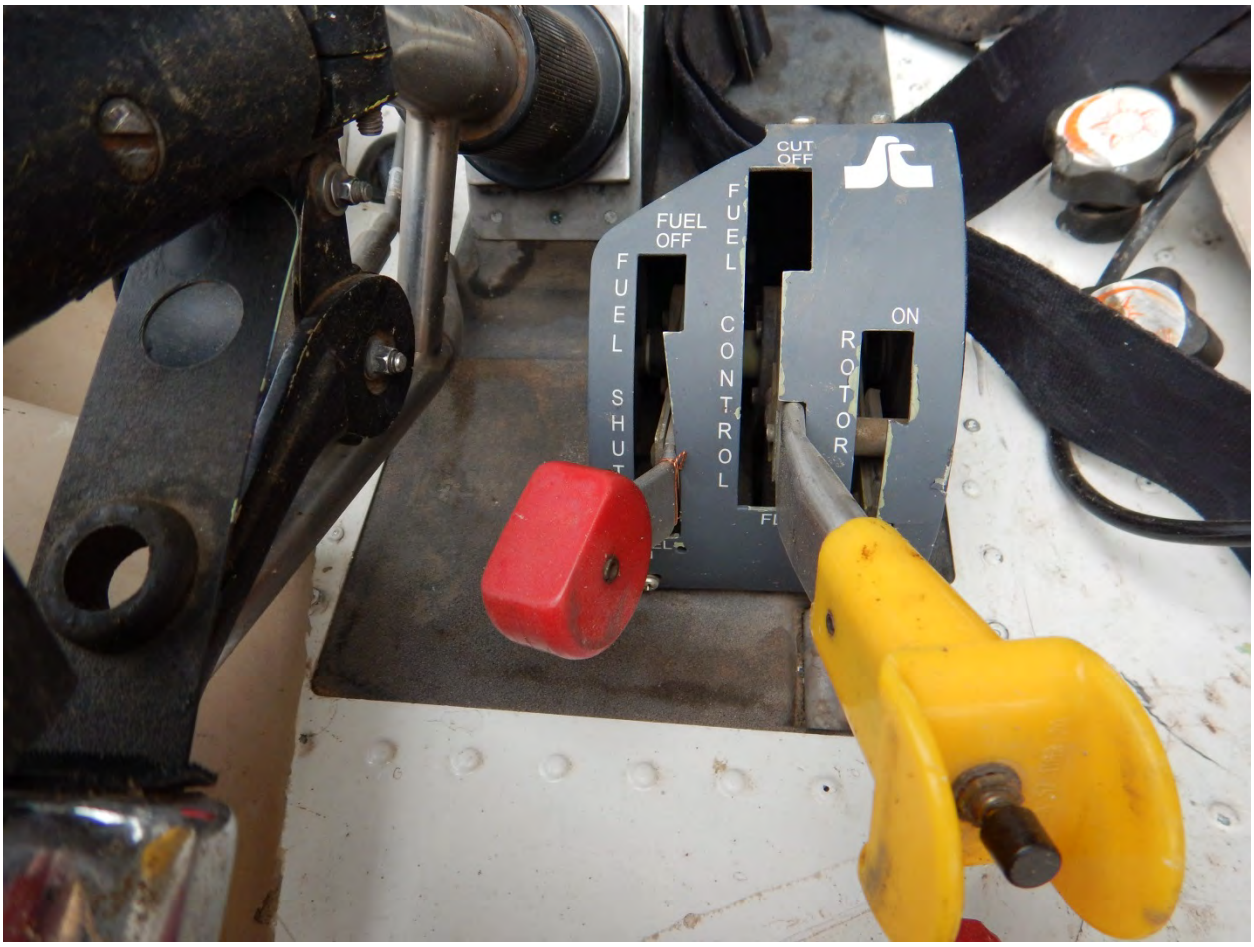

Photo 5 Honeywell Photos of Fuel Control and Fuel Shutoff Levers

Tail Boom and Tail Rotor System

The tail rotor flex ball cable for the tail rotor pitch was crimped/kinked in the midsection of the deformed cabin wreckage, and could not be moved. But both ends were attached to their pinions.

The forward portion of the tail boom remained attached to aft fuselage, but was bent down. The tail boom fractured and separated in two places, aft of the tail rotor gearbox, and forward of the horizontal stabilizer.

The forward portion of the tail rotor drive shaft at the forward engine coupling separated at the flange coupling internal bore with jagged, angular signatures. The forward Thomas coupling was still attached with its spline fitting. One foot aft, the tail rotor drive shaft separated with a blunt impact signature. The aft 3 feet of the tail rotor drive shaft separated with a blunt impact

signature, and remained attached to the tail rotor gearbox. The tail rotor blades remained attached to the hub; but they had fractured, and were loose at the composite hub.

Photo 6 Tail Rotor

The chip detector on the tail rotor gearbox was clean but not operable; the wire lead appeared to be snipped and tied off.

Engine to Main Rotor Transmission

The engine to transmission input shaft was displaced at the spline interface (right out of engine). The forward end of the engine to transmission shaft flex coupling was splayed, and separated with power signatures. The entire transmission separated from the airframe; all four mounts were broken midspan from torsional overload, and the dogbone was separated from the transmission deck.

The chip detector at the main rotor transmission was clean.

The hydraulic pump was attached to the transmission, and operated normally when manually rotated.

Main Rotor System

The push/pull rods to the three main rotor servos were fractured and separated with blunt force.

All three blades remained attached to the main rotor hub. All three Starflex arms were broken midspan. Two of the main rotor blade outboard sections had impact damage and trailing edge separation.

Photo 7 Main Rotor Hub Starflex

Photo 8 Main Rotor Blades

2.0 Engine Examination

The engine was a Honeywell LTS101-700D-2, serial number LE-46019C. The type certificate number was E5NE; the maximum continuous power was 650 hp.

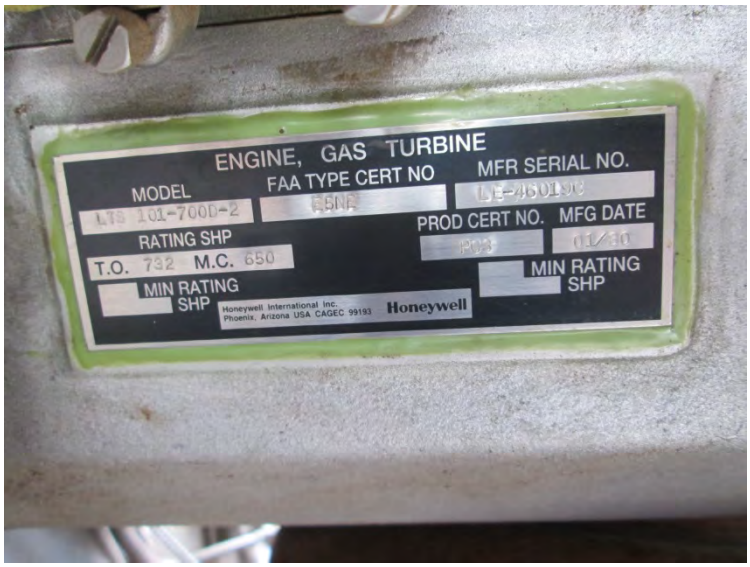

Photo 9 Engine Dataplate

Continuity was confirmed from the power turbine rotor to both the tail rotor output and the transmission input.

The Sprag clutch was freewheeling; when turned backwards, it did not move.

There was no debris on the chip detector.

There was a rub mark on the power turbine rotor shroud.

There was metal spray on the aft side of the power turbine nozzle.

Photo 10 Honeywell Photo of Metal Spray

There was debris in the inlet similar to dried grass and twigs.

The axial compressor exhibited leading edge damage with the outer tips bent opposite the direction of rotation.

Photo 11 Honeywell Photo of Axial Compressor

The left and right motor mounts were broken/ fractured.

The gas generator and power turbine were free to rotate, and could be rotated by hand.

The engine fuel filter was clean, and the bowl contained a clear fluid.

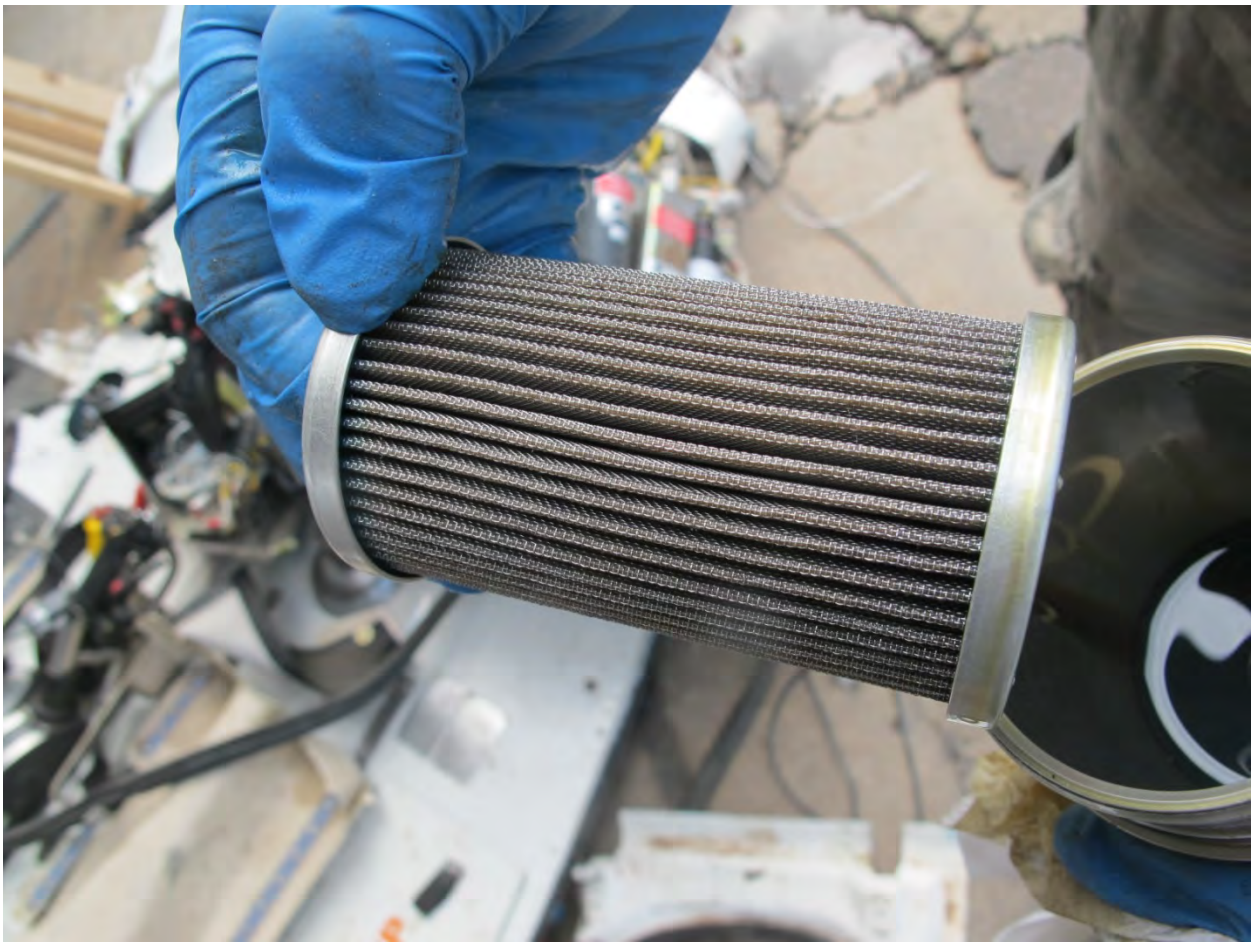

Photo 12 Engine Fuel Filter

The oil filter was clear of debris.

The fuel control input lever was in the MAX position.

The power turbine governor lever was indicating a position between 80 percent and 85 percent.