NTSB MEMORANDUM FOR RECORD

Adam Gerhardt
Air Safety Investigator
Eastern Region, Office of Aviation Safety (ERA)
National Transportation Safety Board

Date: 4/30/2020
Persons Contacted: See Below
NTSB Accident Number: ERA20LA160

Representatives Todd Tuttle (Director of Safety, Haverfield Aviation), Stan Braun (Director of Maintenance, Haverfield Aviation) and Haverfield Aviation line mechanics assisted with two virtual examination of the helicopter directed by the NTSB investigator-in-charge (IIC). FaceTime was utilized to observe and direct the actions of the party members. This memorandum is a summary of the findings from the two examinations. The NTSB investigator-in-charge (IIC) was not permitted to travel to the examination location due to NTSB safety protocols as a result of the COVID-19 pandemic.

Narrative:

The helicopter had been recovered to a hangar at the Haverfield Aviation Headquarters in Gettysburg, PA. Tamper tape was viewed on all doors and access compartments. The NTSB IIC directed the tape to be removed so that the examination could begin.

The battery master was turned on. The fuel gauge, as indicated, displayed about 150 lbs of fuel onboard.

Photo 1: View of the fuel gauge showing about 150 lbs

Prior to removing any fuel lines or air lines leading to the engine, each were viewed and checked for damage and security. The were no anomalies observed with the fuel and air lines. All lines from the compressor, fuel control, fuel pump, and fuel nozzle were undamaged, and their respective nuts were found secured and tight.

Photo 2: View of the fuel and air lines

With the battery master turned on, the electrical fuel pump switch was moved to the on position, and the pump did not turn on. When the access panels to fuel pump were removed, a voltage indicator when applied to the fuel pump wires found that the normal 28V was being received. All fuel lines on the fuel pump were tight. Fuel was present in the electric fuel pump.

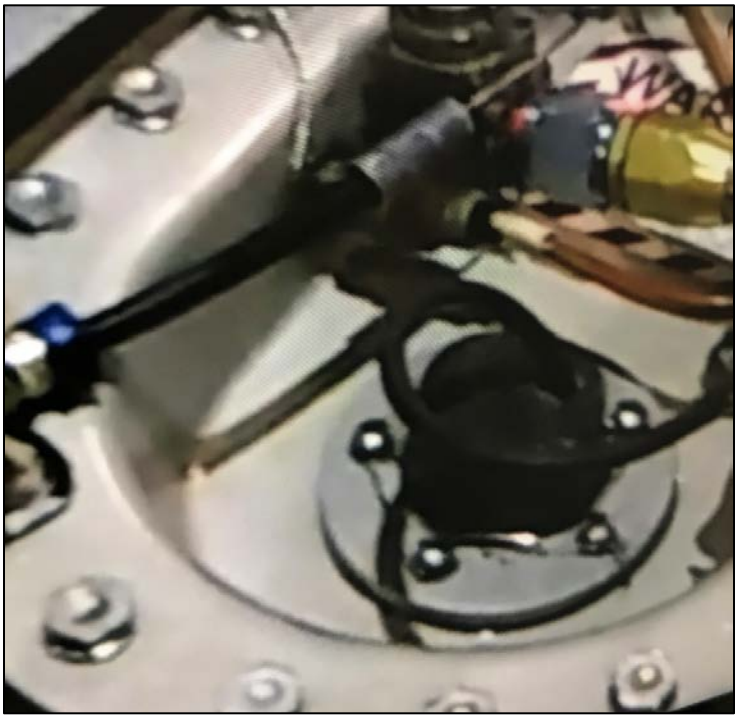

Photo 3: View of the electric fuel pump

The fuel pump screens for the engine and electrically driven fuel pumps were clear of obstructions.

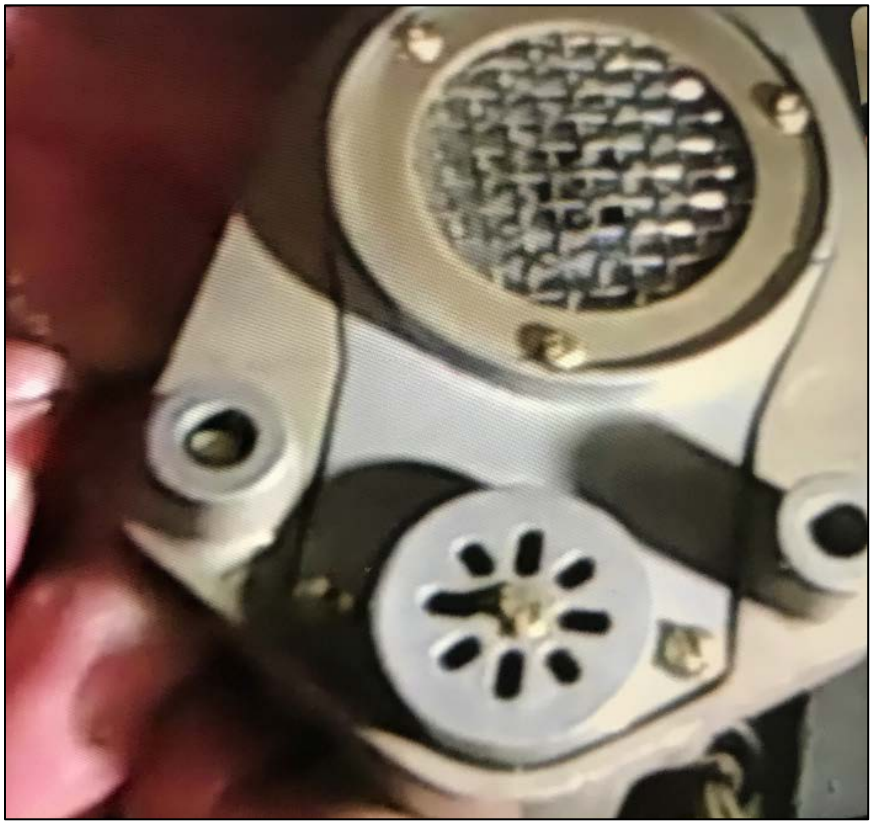

Photo 4: View of the fuel pump screens

The fuel line coming off the electric fuel pump was boroscoped. No obstructions were seen. The electrical fuel pump was replaced with a new fuel pump, and when the master was turned on, the new fuel pump activated. The fuel pump was used to pump out fuel from the fuel tank.

A total of 146.6 lbs of fuel was pumped/ drained from the helicopter. It was reported that there was no evidence of fuel spillage at the accident site, and the fuel tank was not compromised when examined postaccident.

The fuel shutoff valve fuel line (the main fuel line) leading to the engine had low pressure air blown through the line from the engine to the fuel tank. Remnants of fuel was in the line and a small unidentified object, about 1/5th the size of a pea was found and placed into a bag.

The engine driven fuel pump filter housing was found secured to the engine. It was then removed, and small remnants of fuel was inside of the filters housing. The housing and filter contained no debris.

Photo 5: View of the engine driven fuel pump filter housing with remnants of fuel

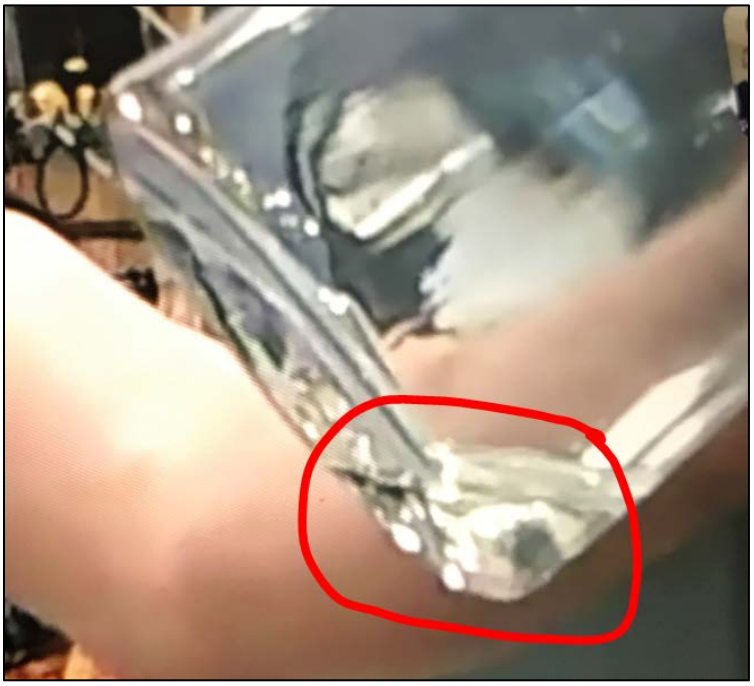

Photo 6: The red circle provides a view of the remnants of fuel found in the engine driven fuel filter housing

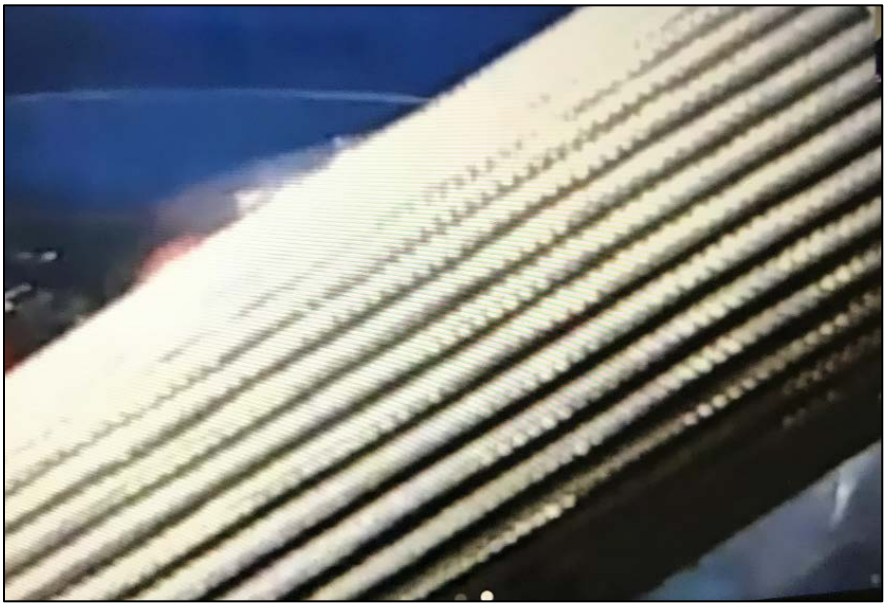

Photo 7: View of the engine driven fuel pump filter

Photo 8: A second view of the engine driven fuel pump filter

With the battery master on, when the ignition was pressed momentarily, the igniters were heard, and the compressor spooled up. The cyclic, collective, and throttle all had continuity through the full range of motion. The main hook release lever located on the cyclic functioned normally. The electric button main hook release located on the cyclic operated normally (note, the circuit breaker was found pulled at the accident site).

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Representatives Todd Tuttle (Director of Safety, Haverfield Aviation), Stan Braun (Director of Maintenance, Haverfield Aviation) and Haverfield Aviation line mechanics assisted with a second examination of the helicopter directed by the NTSB investigator-in-charge (IIC) via FaceTime.

Narrative:

A vacuum check of the fuel system was performed. The fuel system held 8 inches (Hg. Vac.) of pressure for 2 minutes. The vacuum line was attached to the upper fitting of the fuel bowl for the test.

A PC line pressure check was performed. Via an air compressor, 50 lbs of air pressure was applied to the PC filter. There were no pneumatic leaks observed when fluid was applied to the lines.

Figure 1: Photographs taken during the PC line pressure check

Figure 2: Photographs taken during the PC line pressure check, while fluid was applied to the lines

On the airframe oil scavenge filter, the red indicator was stowed and no anomalies were observed.

Figure 3: The airframe oil scavenge filter, with the red abnormal indicator stowed

The only fuel sump is located under the main fuel tank under the fuselage. No airframe mounted fuel filter was installed. There were no obstructions noted in the engine air inlet.

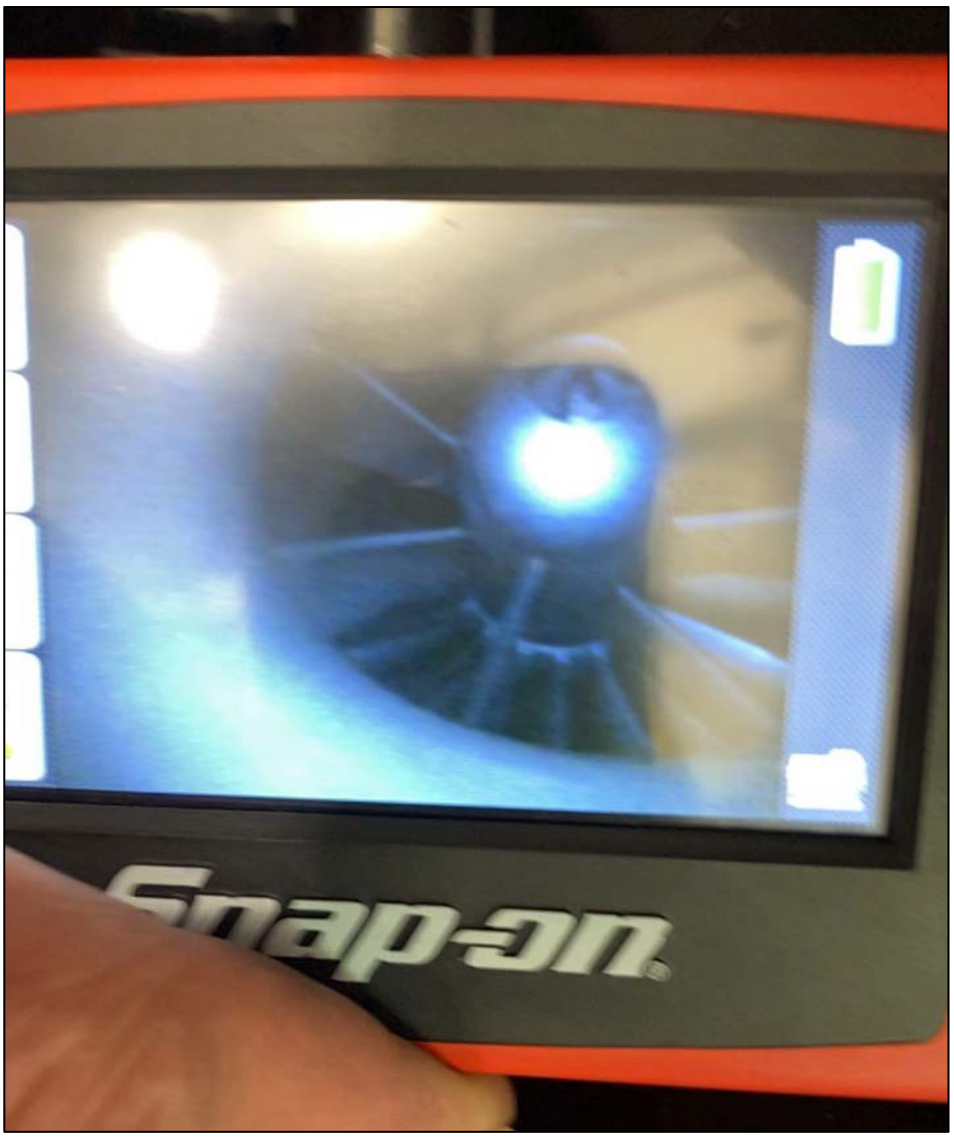

Figure 4: Photograph of the unobstructed engine air inlet.

The oil filter safety pin was removed. The external oil filter and oil that leaked out from the casing (once it was removed for examination) was free of contaminants.

Figure 5: View of the oil filter and oil sample

The oil level in the main oil tank was at the bottom edge of the sight glass window.

Authorization was provided to remove the engine (according to Rolls-Royce instructions) and crate it for further examination at Keystone Aviation.