



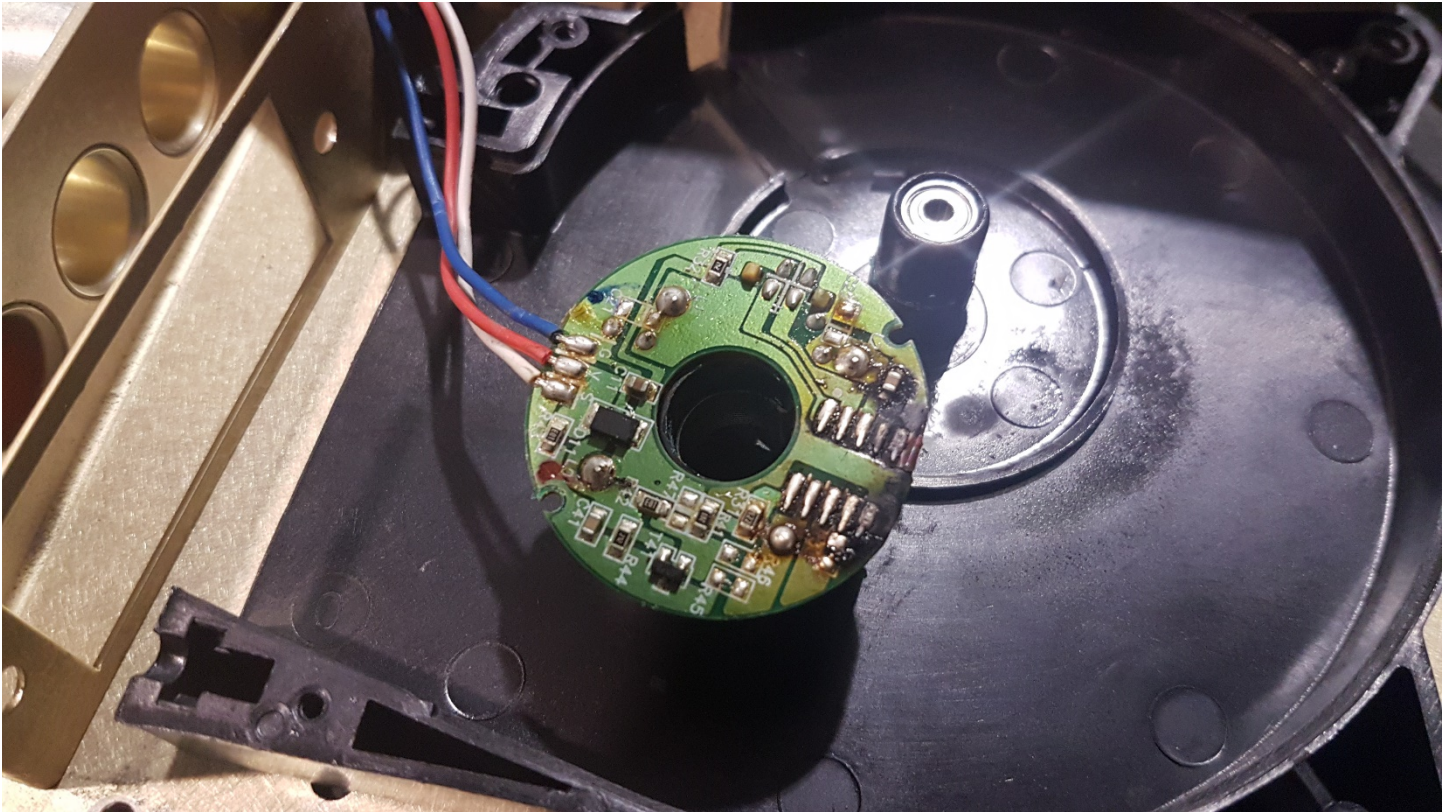
The National Transportation Safety Board

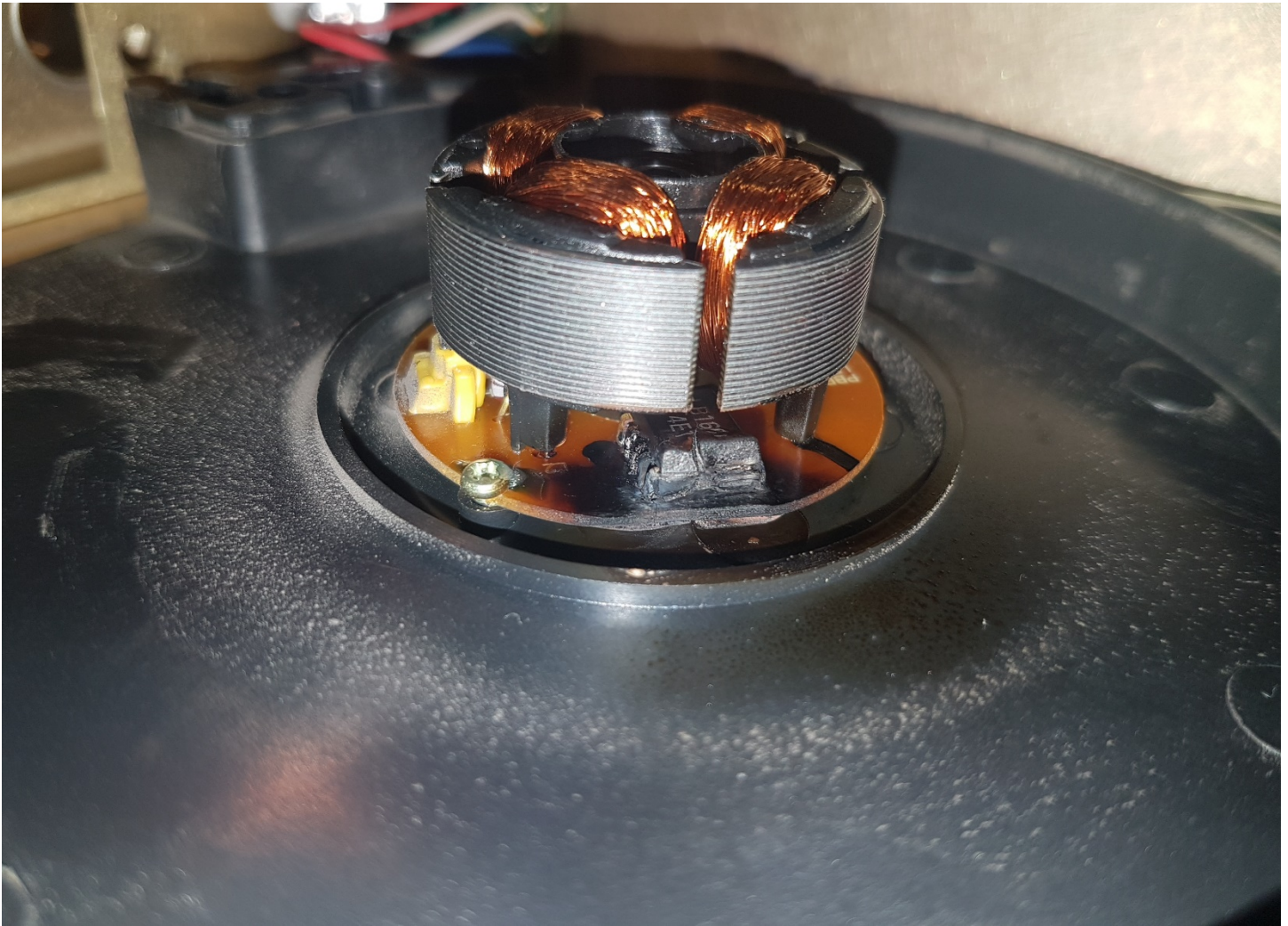
Office of Aviation Safety
Central Region
Memorandum for the Record
Electrical System
Examination Findings
CEN20LA058
Bandera Texas
January 11 2020

An examination of the electrical system was conducted and supervised by the FAA and NTSB.

- After recovery to a secure hangar, the fuselage was held upright on the hangar floor and with wooden supports placed laterally beneath the fuselage near the forward and aft wing spar attach points and a wooden beam running through the fuselage where the main wing spar would normally be located. The wings and horizontal stabilizer, including the elevator and trim tab, had been removed by recovery personnel. The cabin interior furnishings including the seats, sidewalls, and floorboards had been removed by recovery personnel. The Garmin PFD's, MFD, and the Aspen Avionics standby flight display had been removed from the instrument panel by recovery personnel prior to transporting the aircraft to the hangar. These displays were re-installed in the instrument panel prior to the examination.
- The aircraft battery remained in the aircraft, but the power and ground wires had been disconnected by recovery personnel. A review of the circuit breaker panels in the cockpit revealed that the following circuit breakers on the left side circuit breaker panel were in the tripped/extended position: GEA, PFD 1 FAN, HYDRAULIC PUMP CONTROL, and HYDRAULIC PUMP POWER. No other circuit breakers were observed to be in the tripped/extended position. The cockpit overhead electrical switches were in the OFF position.
- The battery was reconnected, and the GEA and PFD 1 FAN circuit breakers were reset. The BATT MASTR was switched to the ON position. The pilot's side PFD display came on as expected and no adverse reactions were observed. Some CAS messages and aural warnings were noted which seemed consistent with the aircraft's configuration and level of disassembly.
- The AV BUS MASTR was switched to the ON position. The copilot's PFD and the MFD displays began powering up as expected. No smoke was observed during the entire power up sequence. The white AVN 1 FAN FAIL message was displayed in the CAS message area of the PFD and remained illuminated. Visual examination of the avionics fan located forward of the instrument panel and above the pilot's rudder pedals revealed that the fan was not operating. Examination of the electrical connector on the fan assembly revealed that it was slightly mis-aligned. Further examination of the electrical connector and nearby electrical wires did not reveal any damage or abnormalities.
- The electrical connector was removed from the fan assembly and proper voltage was verified at the connector using a multi-meter. Visual examination of the avionics cooling fan located forward of the instrument panel and above the copilot's rudder pedals revealed that it was operating as expected.
- The pilot's side fan was removed from its mount and connected to the electrical connector on the copilot's side. The fan did not operate. The fan from the copilot's side was removed from its mount and connected to the electrical connector on the pilot's side. The fan operated as expected.

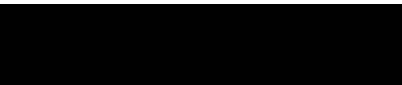
- After confirming that the pilot's side fan would not operate when connected to an electrical power source, the fan was disassembled. After removing the fan blades from the motor assembly, an area of thermal damage and discoloration were observed on the circuit board.





- Photographs of the fan assembly and thermal damage of the fan circuit board were sent a NTSB Fire Specialist. The Fire Specialist stated that the damage to the fan circuit board would likely have produced smoke, and the smoke would probably be irritating to the eyes, which is consistent with the pilot's account of the flight.

Alexander Lemishko



Senior Air Safety Investigator
NTSB Central Region Aviation