



Memorandum For Record

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The following below was cut and pasted from an e-mail by the owner to NTSB on April 23, 2020, at 1611 EDT.

“Addressing the overheating problem. No I don't know, for sure, what caused a seemingly ongoing heating problem.

But here are some of the steps that I took to address them. My 1st step was calling Titan and I talked to their test pilot Bill Kolano (no longer an employee of Titan) and he told me when he was running a "new" engine, he would fill the small reservoir tank which held the radiator cap until it overflowed, and then fill the plastic recovery/overflow tank mounted on the firewall. He then told me to do a run up and let the engine cool down. After one or two cycles, the engine would no longer draw coolant from the plastic tank. Then you knew your system was full. This of course makes sense but for me it was no joy. I let the engine cool overnight (multi-times) and sometimes the plastic tank showed signs of moderate recovery, and sometimes no activity at all. I replaced the radiator cap a couple times. The radiator cap is fastened to a billet machined filler neck. This unfortunately is located behind the PSRU and underneath the engines, (Honda's) air Plenum intake. It was extremely difficult to get the cap on and off, or to inspect it. The filler neck was held on by four setscrews. I removed the filler neck from the engine so I could examine the relationship of these two parts. I found that the machining in the filler neck had a rather soft stop, so when the cap was tightened, one of the locking ears, instead of hitting a stop, would ride up on this softly milled slope and would ultimately allow the cap to pop up a little, not allowing a seal. I took a Dremal and files and cleaned up this milling and thought I had corrected the problem. This was all done before the 1st test flight.

Another thing I did at this time was to separate the engine from the coolant system, that is anything exterior to the engine. I then filled both separately and by doing so I determined that the system should hold around 2 gallons of coolant when both are full, this gave me a baseline of what to expect in the future. The overheating problems however continued. In the month before the crash, I removed the filler neck entirely. I then blocked off the top of the engine's reservoir

tank with a plate of aluminum, threaded for a 90° fitting. I then purchased a pressurized coolant tank of aluminum and mounted this (after removing the plastic overflow tank) onto the firewall as high up as I possibly could. This allowed any displaced coolant to return to the engine by simple gravity when the plane was at rest. This system was tested in run ups and seemed to be working, and I had great hopes, but the last flight was it's first flight test. After the crash the coolant (Honda) pump was examined, it spun freely and visual inspection showed no obvious problems.

We did lay one leg of a framing square across the cylinder heads and there was no obvious signs of warpage i.e. no daylight between the square and the cylinder head.”