



Michael J. Hodges
Investigator-In-Charge
Office of Aviation Safety, Central Regional Office

Date: 09/03/2024

Subject: CEN24LA318

Contact: Isaac Boehr

The NTSB investigator-in-charge spoke with the accident pilot, Isaac Boehr on the telephone. Isaac was the pilot of N4004K (Ayres S2R-600 airplane equipped with a Honeywell TPE331 series turboprop engine), with the aerial application accident that occurred on 06/20/2024.

Isaac has about 990 total flight hours, with about 20 total flight hours in the Ayres/Thrush S2R series airplanes. His most recent flight review was on 06/13/2023. Isaac holds a Federal Aviation Administration (FAA) second class medical certificate issued on 03/13/2024, with no limitations. In addition to holding a FAA commercial pilot certificate (airplane single engine land, airplane single engine sea, and rotorcraft-helicopter), he holds a FAA mechanic certificate for airframe and powerplant.

The airplane was owned and operated by Heritage Ag LLC, a 14 *Code of Federal Regulations* Part 137 aerial application operator based in Lakeview, Michigan.

This was Isaac's first season performing aerial application work. Isaac was utilizing a flight helmet, that had a visor, during the accident flight. Isaac also utilized a four-point restraint system during the accident flight.

Isaac reported he did not feel fatigued during the accident flight. Isaac was uninjured from the accident.

Isaac was working on the second field of crops that morning. The wind was originating out of the east, about 5 to 10 mph. The airplane was flying to the west, about 10 ft

above ground level over the crops, and was traveling about 130 mph. The sun being in Isaac's eyes during the accident was not a factor.

Isaac had completed applying chemical to the crops. Isaac was making sure that the hopper was empty of the liquid chemical and part of that process is to visually check the spray boom pressure gauge and see what the gauge is reading. The spray boom pressure gauge on N4004K is mounted on the left side spray boom, behind the trailing edge of the left wing, and is about midpoint behind the left flap. The spray boom pressure gauge is a typical format and size analog gauge you would see inside of an airplane cockpit. Isaac estimated the distance from his eyes to where the spray boom pressure gauge is located, was about 8 ft. Isaac added that he was able to partially turn and view the spray boom pressure gauge with using the four-point restraint system.

It takes one to two seconds to view the readings accurately on the gauge due to the distance from the spray boom to the cockpit. The gauge is designed to be close to you and even with him having vision better than 20/20 vision, the lines and numbers take time to read from the cockpit. It would make a world of difference if the gauge was located inside of the cockpit.

To view the spray boom pressure gauge, you would have to look to the left and down. Isaac reported that if you were sitting in the cockpit facing forward, if you were to look at the spray boom pressure gauge, you would be looking at approximately the 8 'clock position. He reported there is only one spray boom pressure gauge on the airplane, and it is located on the left spray boom. He reported that Air Tractor airplanes typically have a spray boom pressure gauge installed inside of the cockpit, so pilots can keep their vision facing forward and not have to look outside of the cockpit when reading the pressure on the gauge. He classified the spray boom gauge being located outside of the cockpit on the spray boom, as a bad design.

Isaac momentarily and partially turned his head and body to the left to view the spray boom pressure gauge. He does not recall the reading value on the spray boom pressure gauge at the time, when he looked at it. Shortly after viewing the spray boom pressure gauge, the main landing gear impacted terrain. Isaac immediately pulled the airplane up and increased the altitude of the airplane. The left main landing gear was pushed up into the left wing from the terrain impact and it caused a fuel leak from the left wing fuel tank. Isaac then began looking for an area to perform a forced landing. A forced landing was performed to a flat grass field on private property shortly after. The airplane came to rest upright on the nose and the forward fuselage. Isaac performed an emergency shutdown of the airplane, and he was able to egress from the airplane without further incident.

The airplane is equipped with an Ag-Nav Guia Gold navigation system, that is electronic. Isaac said this navigation system does not show spray boom pressure. The airplane is also equipped with an Electronics International MVP-50T engine monitor system, that is electronic. Isaac said that this engine monitor system was not configured to show spray boom pressure.

He believes that all the airplanes at Heritage Ag LLC are set up like N4004K, with a spray boom pressure gauge mounted outside of the cockpit. The other type of airplanes Heritage Ag LLC operates are Thrush S2R series airplanes.

The airplane sustained damage to several areas including the propeller, the fuselage, the main landing gear, the left wing, and the spray booms.

Isaac reported there were no preimpact mechanical malfunctions or failures with the airframe or the engine that would have precluded normal operation.

*** Nothing Follows ***



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Date: 09/05/2024

Subject: CEN24LA318

Contact: Greg Wing and Richard Rasmussen

The NTSB investigator-in-charge spoke with Greg Wing and Richard Rasmussen on the telephone. Greg is the owner of Heritage Ag LLC, a 14 *Code of Federal Regulations* Part 137 aerial application operator based in Lakeview, Michigan. Greg is not a pilot or a mechanic. Richard is a pilot who works for Heritage Ag LLC. Heritage Ag LLC operates five airplanes, and they are all the Thrush S2R series.

Greg reported that the spray boom pressure gauge on N4004K (Ayres S2R-600 airplane equipped with a Honeywell TPE331 series turboprop engine) broke off during the accident sequence. Greg submitted two exemplar photos of a spray boom pressure gauge from N38HA (Thrush S2R-G10 airplane equipped with a Honeywell TPE331 series turboprop engine). N38HA is another airplane in the fleet they operate. N38HA has the spray boom pressure gauge mounted on the left spray boom.

Richard reported that the only source of spray boom pressure for their five airplanes is a gauge mounted on the left side spray boom. All five of their airplanes have the spray boom pressure gauge mounted on the left side spray boom.

Richard reported the reason the spray boom pressure gauge is mounted on the left side spray boom is it provides the most reliable reading. Richard was asked about Air Tractor airplanes having the spray boom pressure gauge mounted in the cockpit and Richard reported he is not familiar with Air Tractor airplanes, as he flies Thrush airplanes.

*** Nothing Follows ***



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Date: 12/05/2024

Subject: CEN24LA318

Contact: Anne Torgerson

The NTSB investigator-in-charge submitted a request to the Federal Aviation Administration (FAA) Office of Accident Investigation and Prevention (AVP-100) on 09/20/2024. Anne Torgerson, FAA aviation accident analyst, processed the request, via email. The request was submitted to the Aircraft Certification Service (AIR).

The request provided background information about the accident with N4004K (Ayres S2R-600 airplane equipped with a Honeywell TPE331 series turboprop engine). The request also included information about the spray boom pressure gauge mounted on the left side spray boom, and that this is the only source for reading spray boom pressure on the operator's multiple airplanes.

A previous accident with CHI03LA273 (N4114A, Ayres S2R-T660) was shared.

The aviation safety issue shared was that there have been at least two accidents where pilots are viewing these externally mounted spray boom pressures gauges on Thrush/Ayres airplanes, and an accident has occurred. From a human performance perspective, pilots are being put in a potentially hazardous situation having to visually acquire and read a gauge that is outside of the cockpit, and not forward facing, during low-level operations.

The FAA was asked if they would consider putting out some guidance to the 14 *Code of Federal Regulations* Part 137 aerial application community regarding this aviation safety issue. Some potential resolutions suggested for this aviation safety issue would be to move the gauge inside the cockpit (as Air Tractor has always done) or perhaps to utilize an electronic source of spray boom pressure inside the cockpit. Electronic source

examples that show spray boom pressure such as the Reabe Air Hopper Quantity Gauge and the Electronics International MVP-50T Engine Monitor were shared.

AIR declined to publish guidance on the safety issue.

*** Nothing Follows ***