

National Transportation Safety Board

Office of Aviation Safety
Central Region



CEN24LA272

WRECKAGE EXAMINATION SUMMARY

ACCIDENT

Date: July 17, 2024
Time: 1453 central daylight time (1953 UTC)
Location: Oakland, Nebraska
Airplane: Air Tractor AT-602
Registration: N622AW

PARTICIPANTS

Investigator	Brian Rutt National Transportation Safety Board Denver, Colorado
Investigator	Cory Maxon National Transportation Safety Board Denver, Colorado
Group Member	Dakota Lowe Air Tractor, Inc. Olney, Texas

ACCIDENT SYNOPSIS

On July 17, 2024, about 1453 central daylight time, an Air Tractor AT-602 airplane, N622AW, was substantially damaged when it was involved in an accident near Oakland, Nebraska. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 137 agricultural flight.

The pilot reported there was a loss of engine power while the airplane was in an aerial-application spray turn. The airplane's aft fuselage was substantially damaged during the subsequent forced landing in a cornfield.

WRECKAGE EXAMINATION TIMELINE

On September 6, 2024, National Transportation Safety Board (NTSB) investigators Brian Rutt and Cory Maxon examined the wreckage with the assistance of Air Tractor investigator Dakota Lowe. The wreckage examination was conducted at Wentworth Aircraft, Lakeville, Minnesota. The NTSB retained custody of the wreckage until it was released to the airplane insurance company via an email message sent on January 12, 2026.

AIRPLANE DESCRIPTION

The airplane was an Air Tractor AT-602, serial number (s/n) 602-1343, registration number N622AW. A Pratt & Whitney Canada PT6A-65AG turboprop engine, s/n PCE-PN0531, provided thrust through a five-blade, controllable-pitch, Hartzell HC-B5MP-3F propeller, s/n EVA3865. The low-wing airplane was equipped with a fixed conventional landing gear and wing flaps.

The airplane's date of manufacture was December 16, 2022.

The airplane's maximum takeoff weight was 12,500 lbs.

The airplane was equipped with a 117-gallon fuel tank in each wing. The wing fuel tanks are interconnected by a header tank and cannot be individually selected. Including the 2 gallons of fuel in the header tank, the airplane's total fuel capacity was 236 gallons, of which 230 gallons were considered usable.

According to the Air Tractor AT-602 Owner's Manual, each wing fuel tank was equipped with two fuel quantity sending elements that are connected in series electrically. The inboard sending element measures fuel level when fuel is present in the lower third of the tank. The outboard sending element measures the fuel level when fuel is present in the upper third of the tank. Both sending elements are active when the fuel level is in the mid-tank range.

As per the AT-602 AFM, the airplane is equipped with a placard installed on instrument panel that states:

Avoid skidding turns which may result in fuel migration from one tank to the other. The engine may quit when either tank becomes empty. Monitor the fuel level in each tank frequently when the fuel level is less than ½ tank.

The AT-602 AFM further states that while conducting agricultural flying:

In addition to being hazardous, a skidding turn can transfer fuel from one tank to another, which will result in flameout if one tank runs dry. Monitor the fuel level in each tank when the fuel level reaches ½ tank. For aircraft with a single fuel gauge, leave the selector switch on the low tank. Fuel transfer can occur when flying a racetrack pattern if the turns are not coordinated.

According to the AT-602 AFM, the airplane is equipped with a low fuel warning system that consists of two float switches, one in each wing tank, connected to a red warning light in the instrument panel. Either float switch can activate the warning light

independent of the other. While in coordinated flight, the floats are positioned so that the warning light is activated with about 22 gallons usable fuel remaining (11 gallons usable fuel per tank). However, a fuel load imbalance due to uncoordinated flight, flying all turns in one direction, or other cause may result in fewer than 22 gallons usable at the time of warning light illumination. The AT-602 AFM stipulates that the fuel gauges are the primary instruments for fuel management, and the pilot should not use the warning light system as a means of determining the amount of fuel remaining.

The AT-602 AFM states that when the low fuel warning light illuminates there is a low fuel condition in either or both wing fuel tanks. To resolve the situation, a pilot should fly the airplane straight and level, monitor the fuel gauges, and land as soon as practical. However, if fuel gauges indicate a fuel imbalance with an adequate amount of fuel remaining, the flight may be continued after allowing fuel to transfer and equalize between the wing tanks. The AT-602 AFM stipulates that an intermittent, or flickering, low fuel warning light should be treated the same as a steady warning light.

The AT-602 AFM states that the indications of an engine flameout include a sudden drop in interstage turbine temperature, engine torque, and gas generator speed (Ng). Additionally, the engine running out of fuel or a temporary interruption of fuel to the engine can result in a flameout.

MAINTENANCE SUMMARY

Recent Maintenance

According to maintenance documentation, on December 11, 2023, the last annual inspection of the airplane was completed at 465 hours airframe total time (AFTT). On June 18, 2024, a 100-hour inspection was completed at 628 hours AFTT.

A review of the available maintenance documentation did not reveal any unresolved maintenance issues with the airplane.

According to the airplane's engine monitor, at the time of the accident, the airplane had accumulated 691.9 engine hours, 251 engine starts, and 865 takeoffs.

WRECKAGE EXAMINATION (SEPTEMBER 6, 2024)

General Wreckage Description

The aircraft wreckage was in a hangar operated by Wentworth Aircraft, Lakeville, Minnesota. The wings, horizontal stabilizers, elevators, vertical stabilizer, and rudder had been previously removed to facilitate recovery. The steel-tube frame of the aft fuselage was bent to the right side of the fuselage. The horizontal stabilizers

remained attached to the aft fuselage. The vertical stabilizer remained loosely attached to the aft fuselage. The rudder remained attached to the vertical stabilizer. The propeller and engine remained attached to the fuselage.

Fuselage

The forward fuselage exhibited minor impact-related damage. The fuselage aft of the cockpit exhibited minor damage. The fuselage aft of the cockpit was bent to the right. The aft fuselage near the aft elevator idler was cut off during wreckage recovery.

The aircraft was equipped with five-point AMSafe inflatable restraints (airbags). The restraints were found in the un-deployed state. The AMSafe ECM was disconnected from the inflators during the examination.

The preimpact position of the powerplant control levers could not be determined due to impact-related damage. The start lever was found on the cutoff stop ramp, the prop lever was found on the feather stop ramp, and the power lever was found on the idle stop ramp.

The cockpit instrument panel contained an Electronics International MVP-50T. The airplane operator had previously provided the NTSB with engine data recorded on the day of the accident (which included 3 agricultural flights). No additional data was downloaded on the day of the wreckage examination because the device was damaged. The agricultural spray GPS system and associated light bar were not present and/or located with the wreckage during the examination.

Examination of the wreckage confirmed that the airplane was equipped with the required cockpit placard that stated:

Avoid skidding turns which may result in fuel migration from one tank to the other. The engine may quit when either tank becomes empty. Monitor the fuel level in each tank frequently when the fuel level is less than ½ tank.

Wings

The wings were separated from the wing attach angles and the wing center splice was found unbolted. Both wings were separated from the fuselage. The left wing exhibited an upward bend near the outboard end of the wing. The left aileron and flap remained attached to the wing. The right wing exhibited crush damage in the upward direction to the outboard leading edge of the wing. The right flap and aileron remained attached to the wing.

Empennage

The empennage surfaces remained attached to the aft fuselage which had been cut from the main fuselage during wreckage recovery. The vertical fin exhibited a left bend. The rudder remained attached to the vertical fin. The left elevator remained attached to the horizontal stabilizer. The right elevator separated from the horizontal stabilizer, but remained attached to the elevator control horn assembly.

Fuel System

Fuel Tanks

The fuel tanks did not exhibit any evidence of impact-related damage and were not otherwise breached. The interior surfaces of the wing fuel tanks were free of debris. The fuel tank access panels were removed and the compression rib passthroughs were inspected. All passthroughs clear of any blockage.

The finger strainers were removed and were found clean. The fuel cap O-rings were in good condition.

The fuel quantity sending elements moved freely through their full range of motion. The fuel sender resistances were checked with a multimeter at the inboard wing bulkhead connector. The results of the fuel sender elements resistance tests are presented in table 1.

Inboard Sender	Outboard Sender	Left Wing Resistance (Ω)	Right Wing Resistance (Ω)
Down	Down	1.5	0.6
Up	Down	31.4	31.0
Down	Up	29.5	29.6
Up	Up	59.9	59.5

Table 1. Fuel sender resistance test results

When tested with a multimeter, the low fuel warning switches were electrically open when their respective float was raised and indicated circuit continuity (0.2 ohms resistance) when lowered. The incandescent lightbulb associated with the low fuel warning light was removed for examination and testing. The lightbulb filaments were intact without any noticeable stretching. The lightbulb illuminated when connected to an external battery power source.

Header Tank

The header tank exhibited an impact-related rupture at the top of the left end plate. The 90° fuel line inlet fitting attached to the left end plate exhibited evidence of impact-related damage. There was no evidence of a fuel leak on the fuselage panels situated beneath the header tank. The inside of the header tank contained minor particle debris.

Fuel Lines

The fuel lines from the fuel tanks to the firewall fuel filter were clear of debris or blockage. The fuel line between the left fuel tank and the header tank was clear of debris or blockage. The fuel line between the right fuel tank and the header tank was clear of debris and blockage, but there was a small piece of extruded rubber hose material near the hose end. The fuel hoses between the header tank and firewall fuel filter were free of debris.

Fuel Vent System

The fuel vent system was damaged and contained separations. The left-wing fuel tank vent outlet at the outboard end of the wing was found bent inboard, creating a kink in the vent line; however, when tested, the vent line passed air freely between fuel vent outlet and the left fuel tank. There was no air blockage noted with the right fuel tank vent when tested by blowing air through the vent line into the right tank. There were no blockages observed to the fuel vent interconnect between the fuel tanks.

Fuel Control Unit Fuel Return

The fuel return line was removed from the fuel control unit (FCU) and blown through, with air felt at both left and right tees.

Fuel Screens

The firewall fuel filter was removed, and the screen was free of significant debris. The filter housing was full of Jet-A fuel. The FCU filter bowl was removed. Fuel was present in the filter bowl. Fine particle debris was observed in the bottom of the bowl. No significant debris was identified on the filter screen.

Fuel Drains

The header tank and boost pump fuel drains were opened. No significant amount of fuel was recovered from these drains.

Fuel Valve

The fuel valve was found in the "OFF" position. When the fuel valve lever was moved to the "MAIN" Position, the fuel valve was found to be correctly positioned.

Flight Controls

All airplane flight controls were present at the examination. At the time of the examination the rudder trim wheel in the cockpit was in the full-nose-left position. However, due to the impact-related damage to the aft fuselage and subsequent removal of the empennage during wreckage recovery, it was not possible to determine the preimpact position of the rudder trim.

Engine

The engine remained attached to the airframe. The exhaust ducting was deformed which prevented rotation of the engine. The fuel control unit fuel bowl and fuel filter were removed and inspected. The FCU bowl contained fuel consistent with Jet-A fuel. The fuel bowl also contained a minor amount of debris at the bottom. The debris was consistent with dirt. The FCU filter was cut open for inspection and was free of debris. The air intake filter was examined with no anomalies observed.

Propeller

The propeller remained attached to the engine and all five blades remained attached to the hub. All blades showed little to no rotational scoring consistent with low or no power being produced at the time of impact.