

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN24FA278

INVESTIGATION SUMMARY

January 6, 2025

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A. ACCIDENT

Location: Oxford, Indiana
Date: July 22, 2024
Time: 1830 EDT
Airplane: Air Tractor AT-602, N602WR

B. PARTICIPANTS

IIC	Joshua Lindberg NTSB Dallas, Texas
Investigator	Brad Miller NTSB Aurora, Colorado
Party Member	Kyle Schroeder Air Tractor, Inc. Olney, Texas
FAA Inspector	Brandon Brasfield FAA Indianapolis, Indiana

C. SUMMARY

On July 22, 2024, about 1830 EDT, an Air Tractor AT-602 airplane, N602WR, was substantially damaged when it was involved in an accident near Oxford, Indiana. The pilot was fatally injured. The flight was conducted under 14 *Code of Federal Regulations* Part 137 as an aerial application flight.

According to the airplane owner and operator, the pilot was applying five liquid products to two fields near the accident site. The airplane departed with the fuel tanks full. Figure 1 shows the application area with the flight track and intended fields.



Figure 1. Google Earth image of the accident flight track and spray areas.

The airplane's SATLOC GPS data revealed that the pilot sprayed most of field 1, then field 2, and finally returned back to the south side of field 1 for a trim pass. The SATLOC data ended near the end of the trim pass.

Flightaware track data revealed that the airplane completed the trim pass on the south side of field 1 and continued to the east. The airplane then slowed and initiated a left climbing turn to the north in the direction of the accident site.

Recorded FAA ADS-B data did not contain as much information as the SATLOC and Flightaware data, which could have been due to limited ADS-B covered in the area and the low altitude of the accident flight.

D. DETAILS OF THE INVESTIGATION

1.0 Accident Site

The airplane was found inverted in a flat soybean field about 2.5 miles southwest of Oxford, Indiana (figure 3). The soybean crop was about 3 ft tall. The airplane was inverted, and all four corners of the airplane were located at the site. A post impact fire resulted in thermal damage to the aft portion of the engine compartment and immediately aft of the firewall, with no spread noted to other portions of the wreckage. There was sooting on the left horizontal stabilizer and elevator that is consistent with PT6A engine soot accumulated during Air Tractor engine operations. Then fire was extinguished by first responders.

The airplane was on a heading of about 137 degrees magnetic. Left behind from the pilot extrication activities, the aircraft was supported aft of the cockpit area with a stack of wooden and plastic cribbing and a lifting strap was attached to the tail of the aircraft. The wings and all control surfaces were located in the immediate area of the wreckage. There were no horizontal ground scars or crop disturbances noted.

At the time of the examination, no strong smell of fuel or chemical was noted.

There were no power lines, towers, or guy wires noted in the immediate vicinity of the accident scene. The nearest obstacles that were noted were a line of trees near a house about 900 ft to the south and southwest of the wreckage. Also noted were power distribution lines that ran along the northern edge of E 800 S street, about $\frac{1}{4}$ mile to the south of the wreckage. No wire strike marks or tree strike marks were noted on the leading edges of the wings, prop blades, horizontal stabilizers, or main landing gear. The main landing gear were fitted with aftermarket wire cutters. No nicks or evidence of strikes were noted on these wire cutters.



Figure 3. Aerial view of the accident site.

2.0 Airframe Examination

FUSELAGE: The fuselage was found inverted with crush damage to the top, including the cockpit overturn structure. The cockpit overturn structure, including the attached seat back were rotated aft at least 45 degrees. Occupiable space was not maintained in the cockpit.

The harness and lap belt were found buckled and attached in the proper location with attachment hardware installed. There were cuts in the shoulder harness and lap belt consistent with first responder extrication efforts. The aircraft was equipped with AmSafe Inflatable (airbag) restraints in the shoulder harnesses. These airbags had fully deployed.

The cockpit doors were both found detached and laying adjacent to the fuselage.

The preimpact position of the powerplant control levers could not be determined due to impact forces and fire/heat damage, but the cables were continuous from the STC'd Kawak throttle quadrant to the engine attachment points.

LANDING GEAR: The main gear springs were both found attached in their normal positions to the fuselage. The fuselage tubular structure around these attach points were separated in several places, which allowed the landing gear to be found rotated outward and upward from their normal orientation. Aircraft brakes, wheels, tires, and wire cutters all appeared to be undamaged and remained installed in their respective locations. The tail gear was undamaged.

WINGS: The wings were found with the main wreckage in their normal location and orientation. Each wing was equipped with a 108 gallon fuel tank for a total fuel capacity (including header tank fuel) of 218 gallons (212 gallons usable per the aircraft AFM). Both fuel caps were found installed. It was noted that an aftermarket single point fueling system was installed. The wing center splice connection remained connected and no preimpact structural failures were noted. The ailerons and flaps remained in their proper locations on both wings. Both wings exhibited damage to the leading edge and upper wing skins. The wings did not exhibit any noticeable aft deflection.

The left wing was found with all components attached and in their proper locations. The upper wing skins were deformed downward and formed around the upper cap of the main wing spar. The flap had been partially cut loose during the pilot extrication. There was no fire damage noted on the left wing. The lefthand spray boom was found detached, but laying adjacent to the left wing.

The right wing was found with all components attached and in their proper locations. The lower and leading edge skins had several separations along rivet lines. The righthand spray boom was detached but laying on the lower side of the left wing. The leading edge skins were deformed downward. There was no fire damage noted on the right wing. The aileron counterweight on the righthand aileron was deflected upward but remained attached to the aileron leading edge.

EMPENNAGE: The horizontal stabilizers and elevators remained installed on the aircraft and connected at all attach points. All elevator hinge points remained connected.

The righthand elevator horn was deflected upward approximately 90 degrees to the surface. This deflection is consistent with inertial deformation during the impact sequence. No evidence was noted consistent with this component striking any other object. There was some skin buckling noted on the upper side of the horizontal stabilizer and elevator in the vicinity of the V-strut attachment. The lefthand elevator horn was deflected slightly upward as well.

The vertical fin remained installed on the aircraft. The rudder remained attached at the lower hinge location with separations at the middle and upper hinge location. These surfaces exhibited severe crush damage to about midspan of the vertical fin. The crush damage was oriented downward and bent the top of the surfaces toward the right wing.

All empennage boost/trim tabs and associated linkages were present and connected.

The rudder tail light was present with the rudder tip and the wire deflector cable remained attached to the tip of the vertical fin and the cockpit canopy. This cable had been cut near the vertical fin during pilot extrication.

FLIGHT CONTROLS: Flight control continuity was established to the extent possible by the condition of the wreckage, with all observed separations consistent with impact damage. This is documented as follows:

Elevator Controls: The elevator controls are manually operated by steel and aluminum pushrods connecting the control stick to the elevator control horns through two control idlers. The elevator controls were found to be continuous from the control stick to the elevator control horns.

Rudder Controls: The rudder controls are manually operated by stainless steel cables running directly from the rudder pedal assemblies to the rudder control horns. Both rudder cables remained attached at the rudder control horn. The rudder cables were found to be continuous from the rudder horn to the rudder pedals with the cables properly routed through the cable fairleads and pulleys.

Aileron Controls: The aileron controls are manually operated by steel pushrods connecting the control stick to the aileron control horns through a torque tube, and bellcranks. Control continuity was established from the control stick to the left aileron with no separations observed. Control continuity was established from the control stick to the right aileron with a single separation of the long, wing-mounted aileron

pushrod at the wing/fuselage interface. This separation was consistent with an overload fracture.

Flap System: The flap actuator was found intact and remained installed in the aircraft. This actuator exhibited an extension of approximately 3.75 inches, which correlates to a full flap deflection of 28 degrees.

The flap torque tube was found installed with all hardware in place. The lefthand end of the flap torque tube was found with the arm and pushrod continuous to the flap. The righthand flap controls was found continuous to the flap attachment except that the bolt attaching the right pushrod to the flap was found separated. The shank and nut of this bolt remained inside of the flap attach bushing, but the head of the bolt was not located.

The AT-602 is equipped with a system that droops the ailerons when flaps are extended. This system consists of steel pushrods and bellcranks. These components were found to be continuous.

The Hobbs hour meter was not easily accessed in the wreckage due to the condition of the cockpit but could be seen and appeared to have been damaged with no hour display visible in the instrument window.

The onboard SATLOC GPS unit was found in the rear cargo area and was undamaged. The unit was installed on another of the operator's airplanes and the files were copied to a USB drive. A Pratt & Whitney flight data acquisition, storage and transmission system (FAST) box was undamaged and retained for a possible data download.

SATLOC G4 (PN: 806-1040-000# G, HQN: SATLOC G411488, SN: 1414-07640-LN1-030) and a Pratt & Whitney FAST unit (PN: FAST-A-010-4, SN: 450492)

3.0 Engine Examination

The engine was a Pratt & Whitney PT6A-65AG, serial number PCE-PN0123. The gas generator s/n GG-PN0123 and the power section s/n PS-PN0123. The engine remained attached to the engine mount, with significant engine mount damage and segmentation. The left side exhaust duct exhibited torsional buckling consistent with torque production. The right side exhaust duct was slightly buckled.

The reversing cable was found with its clevis pin and cotter key remained installed. The reversing cam was fractured due the impact sequence and a large portion was missing. The small portion if the cam that remained appeared to be fractured to the impact sequence.

4.0 Propeller Examination

The engine was equipped with five-bladed constant speed, fully reversible propeller. The propeller was attached to the engine propeller flange and reduction gearbox. Each of the blades remained attached to the hub. The propeller assembly was mostly embedded in the ground with 2 blades visible while the other 3 were buried in the ground. The blades exhibited compound bend and twist progression from forward to aft in the sequence of rotation consistent with producing thrust at initial impact.



Figure 2. Damaged propeller blades after removal from the ground.

5.0 Pilot Information

Pilot: Commercial pilot with a rating for airplane single engine land. This pilot reported civil flight experience that included 3,000 total and 5 hours in last six months as of exam dated 6/20/2024. This pilot was issued an FAA second class medical certificate with the following limitation: "Must use corrective lenses to meet vision standards at all required distances." The pilot reported his occupation as self-employed farmer. The pilot reported no concerns and no significant issues were identified by the AME.

FAA medical doctor's review of FAA medical certificates and supporting documentation indicates that this pilot reported no significant medical concerns and the AME identified no significant conditions on physical examination. Based on

available history and physical examinations, this pilot had no known medical conditions that could pose hazards to flight safety.

The pilot's logbooks were not recovered during the course of the investigation.

6.0 Aircraft Information

Air Tractor AT-602, Serial Number 602-1195, manufactured in 2010
Owner/Operator: Bi-State Air, Inc

The owner stated that the airplane was maintained by a company mechanic. He had recently completed a 100-hour inspection of the airplane on July 18, 2024. He stated that during the examination he did not complete any work on or related to the reversing cable and cam. He added that he did not have any concerns with the airplane, there were no outstanding discrepancies, and the airplane was maintained really well.

A review of the SATLOC log files revealed recent flight times:

7/18: 643 minutes
7/19: 666 minutes
7/20: 733 minutes
7/21: 628 minutes
7/22: 388 minutes

The operator confirmed that the 100-hour inspection was completed on the evening on 7/18, after the flights were complete. Since the 100-hour inspection was done at the end of the day on 7/18, then the airplane would have had (3,845.7 + 41.9 hours) = 3,887.6 hours

7.0 Meteorological Information

KLAF 222254Z 29004KT 10SM CLR 27/16 A2996 RMK AO2 SLP141 T02720161

Submitted by:

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