



# Aviation Investigation Final Report

<b>Location:</b>	Wheatley, Arkansas	<b>Accident Number:</b>	CEN18FA263
<b>Date &amp; Time:</b>	July 11, 2018, 06:30 Local	<b>Registration:</b>	N8508P
<b>Aircraft:</b>	Air Tractor AT-602	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Low altitude operation/event	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 137: Agricultural		

## Analysis

A witness reported that the commercial pilot departed on the agricultural application flight to spray a 40-acre field about 5 miles from the airport. He reported that the pilot had loaded the airplane with 400 gallons of chemical before the flight and that the airplane's fuel tanks were full. There were no witnesses to the accident. The wreckage was found in a wooded area between two open fields about 1/3 mile west of the application field. Examination of the accident site indicated that the airplane impacted the top of a berm in an approximate wings-level attitude. Flight control continuity could not be established from the flight controls to their respective attach points on the flight control surfaces due to impact and fire damage; however, all control separations were consistent with overload failure or fire damage. Examination of the engine and propeller revealed characteristics consistent with significant engine power at the time of impact. Examination revealed no anomalies and that would have precluded normal operation of the airframe or engine.

The airplane's wings-level impact attitude is not consistent with a loss of control, and there was no indication of a wire or tree strike either in the wreckage or in the area surrounding the accident site. Toxicology testing and autopsy of the pilot revealed no evidence of physiological impairment or incapacitation; therefore, the reason the pilot did not maintain clearance from terrain could not be determined.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain clearance from terrain for reasons that could not be determined based on the available evidence.

## Findings

<b>Aircraft</b>	Altitude - Not attained/maintained
<b>Personnel issues</b>	Incorrect action performance - Pilot
<b>Not determined</b>	(general) - Unknown/Not determined

## Factual Information

### History of Flight

<b>Maneuvering-low-alt flying</b>	Low altitude operation/event (Defining event)
<b>Maneuvering-low-alt flying</b>	Collision with terr/obj (non-CFIT)

On July 11, 2018, about 0630 central daylight time, an Air Tractor AT-602 airplane, N8508P, was destroyed when it impacted a wooded area about 1.5 miles north of Wheatley, Arkansas, and was consumed by a postcrash fire. The commercial pilot received fatal injuries. The airplane was owned by D-GER LLC, which was operating it as a Title 14 *Code of Federal Regulations* Part 137 aerial application flight. Visual meteorological conditions prevailed and no flight plan was filed for the local flight, which departed about 0600 from Frank Federer Memorial Airport (M36), Brinkley, Arkansas.

A witness reported that the pilot loaded the airplane with 400 gallons of chemical and that the airplane's fuel tanks were full before the flight departed. He stated that the pilot was planning to spray his own 40-acre field about 5 nautical miles (nm) from M36. There were no witnesses to the accident. A witness reported seeing fire and smoke about 0630, and the wreckage was subsequently found by first responders.

### Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	41, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Single
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 None	<b>Last FAA Medical Exam:</b>	January 22, 2018
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	May 15, 2015
<b>Flight Time:</b>	4023 hours (Total, all aircraft)		

The 41-year-old pilot held a commercial pilot certificate with ratings for airplane single- and multi-engine land. He held a second-class Federal Aviation Administration (FAA) airman medical certificate, which was issued on January 22, 2018, with no limitations. On the application for that certificate, the pilot reported 4,023 total hours of flight experience with 200 hours in the previous 6 months. The pilot's logbook indicated that he obtained his agricultural aircraft pilot endorsement on May 1, 2007.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Air Tractor	<b>Registration:</b>	N8508P
<b>Model/Series:</b>	AT-602	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2003	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Restricted (Special)	<b>Serial Number:</b>	602-0670
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	1
<b>Date/Type of Last Inspection:</b>	February 12, 2018 Annual	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Turbo prop
<b>Airframe Total Time:</b>	6965.4 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Pratt & Whitney Canada
<b>ELT:</b>		<b>Engine Model/Series:</b>	PT6A-60AG
<b>Registered Owner:</b>		<b>Rated Power:</b>	1050 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	Agricultural aircraft (137)

The low-wing, single-engine airplane was manufactured in 2003 and was powered by a 1,050-horsepower Pratt & Whitney PT6A-60AG engine equipped with a 5-blade Hartzell propeller. The airplane had a maximum takeoff weight of 12,500 lbs. The most recent annual inspection was conducted on February 12, 2018, at a total airframe time of 6,965.4 hours.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	LIT, 266 ft msl	<b>Distance from Accident Site:</b>	56 Nautical Miles
<b>Observation Time:</b>	05:53 Local	<b>Direction from Accident Site:</b>	75°
<b>Lowest Cloud Condition:</b>	Few / 200 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	3 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	240°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.03 inches Hg	<b>Temperature/Dew Point:</b>	24°C / 23°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Brinkley, AR (M36 )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Brinkley, AR (M36 )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	06:00 Local	<b>Type of Airspace:</b>	

At 0553, the recorded surface weather observation at Bill and Hillary Clinton National Airport (LIT), Little Rock, Arkansas, located 56 nm from the accident site, included wind from 240° at 3 knots; 10

miles visibility; few clouds at 200 ft above ground level; temperature 24°C; dew point 23°C; and altimeter 30.03 inches of mercury.

### Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	On-ground
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	34.946945,-91.114166

The wreckage was found in a wooded area between two open fields about 1/3 mile west of the application field. A 6-ft-deep gully ran northeast-to-southwest through the wooded area. The debris path was over 200 ft long and was oriented on a magnetic heading of 280°. The initial impact point was a shallow ground scar that contained components from the underside of the fuselage. The debris path extended into the wooded area and was comprised wing and empennage components. The fuselage was found on the north side of the gully about 120 ft from the initial impact point. The engine was separated from the fuselage and was found in the gully below the fuselage. Most of the separated fuselage components were found in the gully to the southwest.

A postcrash fire consumed a majority of the fuselage's aluminum skin and components and was limited to the area near the main wreckage. The central portion of the fuselage, including the hopper and cockpit, suffered the most fire damage. All cockpit instruments, circuit breakers, and controls were destroyed. The agricultural GPS system was destroyed by the fire and none of the non-volatile memory components were recovered.

Both wings were destroyed by impact forces. The main wing spar was found bent around a tree. All of the wing ribs and skins were separated from the spar. The rear spar of both wings was fractured in numerous places and found throughout the wreckage.

The rudder, vertical stabilizer, right elevator, and right horizontal stabilizer were found damaged but remained partially connected to the fuselage. The outboard section of the left horizontal stabilizer and left elevator were found in a tree along the debris path.

All flight control surfaces were located with the main wreckage. The control stick was intact in the cockpit and the elevator controls were continuous to the control horns, except for the fire damage to the aluminum pushrod and control stick pivot. The left stainless steel rudder cable displayed continuity from the rudder control horn to the rudder pedal attachment fitting. The right stainless steel rudder cable remained attached to the rudder control horn, but the cable had a "horsetail" separation at about mid-length, consistent with tensile overload of the cable. From this separation, the cable was traced to its forward end, which was embedded in a cluster of melted aluminum and debris. The right rudder pedal was destroyed by fire.

The aileron controls consisted of steel pushrods connecting the control stick to the aileron control horns

through a torque tube and multiple bellcranks and idlers. The primary aileron controls were heavily damaged due to impact forces but were continuous except for separations due to tree and ground impact.

The engine was separated from the mount ring at the "A" and "F" flanges. The exhaust case exhibited significant fore-aft crush damage. The first stage compressor blades exhibited counter-rotational curling of the blade tips and damage to the leading edges of the blades.

The 5-bladed propeller remained connected to the engine propeller shaft. The propeller dome was fractured and the internal spring had been liberated. The dome components and internal spring were found near the main wreckage.

The area surrounding the application field displayed no evidence of tree or wire strikes.

The engine and propeller were recovered from the accident site and sent to the Pratt & Whitney Service Center in Bridgeport, West Virginia, for examination under NTSB oversight. The first stage compressor blades exhibited impact damage and several of the blades were bent opposite the direction of rotation. All the blades exhibited rubbing from contact with the shroud. The third stage compressor stator was rubbed from contact with the spacer. The impeller exhibited rubbing on all the airfoils from contact with the shroud. The front face of the impeller had rubbed the gas generator case.

The downstream side of the compressor turbine disc and blades exhibited rotational scoring from rubbing against the upstream side of the first stage power turbine vane. The compressor turbine shroud exhibited re-hardened melted material from the turbine blades rubbing against the shroud.

Rotational scoring was evident on the downstream side of the second stage disc and blades from contact with the exhaust duct and the No. 3 bearing/power turbine shaft housing. The power turbine shaft was fractured and the fracture surface exhibited features consistent with torsional overload.

The first stage power turbine vane, baffle, and baffle retention rivets exhibited rotational scoring on the upstream side from contact with the downstream side of the compressor turbine.

Examination of the propeller revealed that the piston was fractured and fragmented. One piston fragment displayed an impact mark from the cylinder top corner that was about 2.37 inches from the bottom edge and was roughly equivalent to a blade angle range of 13.7° to 16.7°.

The cylinder was bent and buckled with distinctive marks/creases made by the bottom edge of the piston. Two crease marks were about 2.13 inches and 1.6 inches from the top of the cylinder, equivalent to a blade angle range of about -12° to 9.3°. One circumferential mark was observed about 2.49 inches from the top corner, equivalent to a blade angle range of about 17.3° to 20.3°. Longitudinal scoring marks started from about 3.125 inches below the top corner, equivalent to about a blade angle range about 36° to 39°.

The damage to the 5 propeller blades included face-side chordwise/rotational abrasion, leading edge gouging, tip and mid-blade fractures, bending in the thrust/forward direction, S-bends and twisting toward high pitch.

## **Medical and Pathological Information**

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The Travis County Office of the Medical Examiner, Austin, Texas, performed an autopsy of the pilot. The cause of death was multiple blunt force injuries.

Toxicology testing performed at the FAA's Forensic Sciences Laboratory was negative for carbon monoxide and ethanol in the blood. No tested-for drugs were found in the blood.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Silliman, James
<b>Additional Participating Persons:</b>	Bill Kelly; FAA Little Rock FSDO; Little Rock, AR Kyle Schroeder; Air Tractor; Olney, TX Jeff Davis; Pratt & Whitney Canada; Bridgeport, WV Les Doud; Hartzell Propellers; Piqua, OH
<b>Original Publish Date:</b>	November 6, 2019
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=97732">https://data.nts.gov/Docket?ProjectID=97732</a>

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).