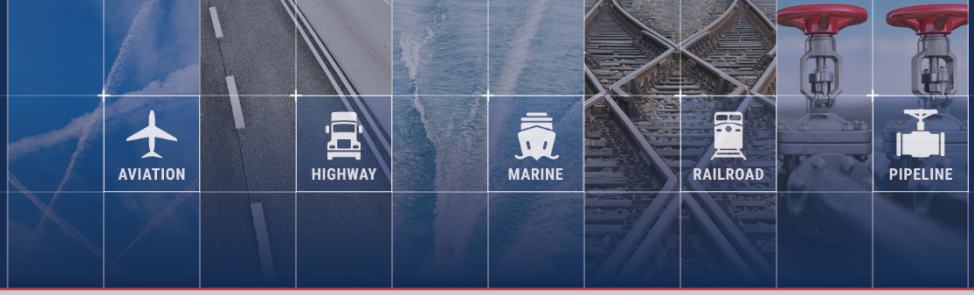

Aviation Investigation Final Report

Location:	Carroll, Iowa	**Accident Number:**	CEN21LA319
Date & Time:	July 13, 2021, 16:54 Local	**Registration:**	N7315P
Aircraft:	AIR TRACTOR INC AT-401	**Aircraft Damage:**	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The commercial pilot had completed half of a planned aerial application of a field when the airplane's engine lost power. The pilot performed a forced landing to a field which resulted in substantial damage to both wings. Postaccident examination of the airplane revealed the inline airframe fuel boost pump would not provide normal fuel output due to wear of the pump motor shaft and leakage of the pump seal. The pump also did not bypass fuel during the on-scene examination but did bypass fuel during testing at the pump manufacturer. The differences in bypass test results were most likely due to plumbing differences between the airplane and the test fixture. The pump manufacturer recommended a 10-year overhaul of the pump and did not provide an hours-in-service overhaul recommendation. The pump was manufactured in 2007, and an airplane logbook record indicated it had been last overhauled in 2013.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The wear-related failure of the airframe fuel boost pump, which resulted in fuel starvation and a loss of engine power.

Findings

Aircraft	Fuel pumps - Fatigue/wear/corrosion

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Maneuvering-low-alt flying	Sys/Comp malf/fail (non-power) (Defining event)
Maneuvering-low-alt flying	Fuel starvation
Maneuvering-low-alt flying	Loss of engine power (total)
Landing	Collision with terr/obj (non-CFIT)

On July 13, 2021, at 1654 central daylight time, an Air Tractor Inc. AT-401, N7315P, sustained substantial damage when it was involved in an accident near Carroll, Iowa. The pilot was not injured. The airplane was operated under Title 14 *Code of Federal Regulations* Part 137 as an aerial application flight.

The pilot stated that he had completed half of the planned aerial application of a field when the engine lost power coming out of a turn. The pilot then performed a forced landing. The airplane impacted terrain and sustained substantial damage to its wings.

The airplane was modified by the installation of a Walter M601E-11 turbine engine through supplemental type certificate SA01281CH issued to Johnson Airspray Inc.

On-scene examination of the engine by a Federal Aviation Administration (FAA) principal maintenance inspector and representatives from GE Aviation revealed no mechanical anomalies that would have precluded normal operation. Subsequent removal and testing of the engine-driven fuel pump and fuel control revealed that both units met test specifications.

During the on-scene examination, a crane was used to level the aircraft, which ensured that the airplane header fuel tank was full. The main fuel line from the airplane fuel filters to the engine-driven fuel pump was disconnected at the fuel pump end and placed in a bucket to capture fuel. The electric-driven airframe inline boost pump was turned on, and there was no fuel flow from the main fuel line. The B-nut on the hose from the header tank to the selector valve was loosened at the selector valve end to confirm there was fuel in the header tank, and fuel was noted to be present. The B-nut was retightened, and the output fuel line from the airframe boost pump was loosened; a small amount of fuel dripped. The dripping could be stopped and started by opening and closing the airplane fuel selector valve. The airframe boost pump was again turned on; there was no steady flow output; and there was no bypass of fuel. The airframe boost pump was removed for further testing and examination at its manufacturer.

The airframe boost pump was a Weldon pump, part number 2003-B, serial number 130661, manufacturing date August 6, 2007. The pump was sent to the facilities of Weldon Pump for

testing and examination under the supervision of an FAA aviation safety inspector. During testing, the pump was placed on a test stand and power was applied. The pump energized and turned; however, there was no fuel output, and fuel leaked from the shaft seal. The pump bypass was also checked on the test stand with no restrictions noted; fuel was able to flow through the pump. Disassembly of the pump from its electric motor revealed the motor's slotted shaft was worn to the point that it would not engage with the pump's rotor tang. Weldon Pump representatives stated that the company recommended a 10-year overhaul requirement of the pump. There was no time-in-service requirement in Weldon Pump's recommendation.

An airplane logbook record, dated July 8, 2013, with an hour meter reading of 2,497.8 hours, stated, "R&R FUEL PUMP P/N 2003B WITH OH UNIT. OPS CHECK GOOD." At the time of the accident, the hour meter indicated 5,136.7 hours.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	51,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Center
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	November 4, 2021
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 25, 2021
Flight Time:	5600 hours (Total, all aircraft), 600 hours (Total, this make and model), 5513 hours (Pilot In Command, all aircraft), 165 hours (Last 90 days, all aircraft), 85 hours (Last 30 days, all aircraft), 9 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AIR TRACTOR INC	**Registration:**	N7315P
Model/Series:	AT-401	**Aircraft Category:**	Airplane
Year of Manufacture:	1987	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	401-0672
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	Annual	**Certified Max Gross Wt.:**	9100 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo prop
Airframe Total Time:		**Engine Manufacturer:**	Walter
ELT:	Not installed	**Engine Model/Series:**	M601E-11
Registered Owner:	Central AG LLC	**Rated Power:**	750
Operator:	Central AG LLC	**Operating Certificate(s) Held:**	Agricultural aircraft (137)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CIN,1204 ft msl	**Distance from Accident Site:**	4 Nautical Miles
Observation Time:	16:55 Local	**Direction from Accident Site:**	50°
Lowest Cloud Condition:	Clear	**Visibility**	8 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.01 inches Hg	**Temperature/Dew Point:**	24°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Carroll, IA (CIN)	**Type of Flight Plan Filed:**	None
Destination:	Carroll, IA (CIN)	**Type of Clearance:**	None
Departure Time:	16:20 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	42.0656,-94.8673(est)

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	Brian Lundquist; Federal Aviation Administration; Des Moines FSDO; Ankeny, IA David Osborne; Federal Aviation Administration, Cleveland FSDO; North Olmsted, OH Sam Farmiga; GE Aviation, US; Cincinnati, OH John McClure; Weldon Pump; Cleveland, OH
Original Publish Date:	January 19, 2023
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=103480