



AIRFRAME AND ENGINE EXAMINATION

NTSB ACCIDENT NUMBER: ERA21FA257

AIRCRAFT REGISTRATION: N402SJ

OPERATOR: Individual

ACCIDENT LOCATION: Kinston, NC

Investigative Team:

NTSB Investigator-in-Charge (IIC): Adam Gerhardt, Senior Aviation Accident Investigator
FAA Coordinator: Dave Laycock, Inspector, Greensboro, NC FSDO

Non-Travelling Accredited Representative:

Helen Tsai, Air Investigations Branch, Transportation Safety Board of Canada
- Technical Advisor: Robert Duma, Air Safety Investigator, Pratt & Whitney Canada

Part Member(s):

Dakota Lowe, Air Safety Investigator, Air Tractor Inc.

BRIEF NARRATIVE

On June 17, 2021, at 2022 eastern daylight time, an Air Tractor, AT-402B airplane, N402SJ, was destroyed when it impacted terrain in Kinston, North Carolina. The commercial pilot was fatally injured. The airplane was operated by the pilot as a positioning flight conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

AIRCRAFT INFORMATION

According to Federal Aviation Administration records, the airplane was a single-seat Air Tractor, AT-402B airplane, serial number 402B-1271. The engine was a Pratt & Whitney Canada PT6A-34AG, Serial Number PCE-PH0858. The propeller was a Hartzell HCB3TN-3D.



Figure 1: Exemplar AT-402 in-flight

MAINTENANCE RECORDS

Review of the airframe, engine, and propeller maintenance records showed that the most recent annual inspection was completed in March 2021 and the propeller was inspected in January 2021. The endorsements were signed off by the accident pilot, who also held an airframe and powerplant mechanic certificate.

YEAR 20 DATE	RECORDING TACH TIME	TODAY'S FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)
3-3-2021	3499.5			Washed Aircraft Removed all Panels, Removed and replaced LH Leading Edge Skin Straps Code 20375- (Replaced missing UG's and Painted Skin Removed Main wheels & Tires tail wheels Cleaned all Bearings packed with grease Reinstalled Main wheels & tail wheel assembly Replaced Flap Motor & coupling Cleaned inside of fuselage Lubed with LPS 2 rechecked AD's Reinstalled panels Inspected this Airframe has been inspected in accordance with an Annual Inspection Ref Air Vector MM and returned to Service [REDACTED]

Figure 2: Maintenance record excerpt

Cycle Counts For PT-6-34AG				Signature	AME ACA/AMO SCA/AMO
Date: 3/03/2021 Total Time: 3999.5 Type Model Series: ETCE 6 PT6AG B/S 975 Serial Number: PCF-PH0858				3-3-2021 3999.5 Performed Annual Inspection Ref Pratt Whitney MM Change Fuel Filter & checked Sensors Changed Fuel Valves WO #3308 Run-up @ 10% check to operate Engine's Operating in the normal range & certify that This Engine has been inspected in accordance with an Annual Inspection & returned to Service	
	LIFE LIMIT CYCLES	CYCLES USED	REMAINING CYCLES		
HUB COMPRESSOR REAR P/N 301311	15,000	933	14,067		
DISC COMPRESSOR 2nd P/N 3013712	24,000	1897	22,103		
DISC COMPRESSOR 3rd P/N 3011723	25,000	1051	23,949		
IMPELLER CENTRIFUGAL P/N 3013174	15,000	1380	13,620		
IMPELLER CENTRIFUGAL P/N 3012280	15,000	1380	13,620		
IMPELLER CENTRIFUGAL P/N 3013252	15,000	1380	13,620		
DISC COMPRESSOR TURBINE P/N 3013411	36,000	1748	34,252		
DISC POWER TURBINE P/N 3024812	24,000	1003	22,997		
Cycle Count Per Pratt & Whitney Service Bulletin No. 130286 James Brinkley [REDACTED]					

Figure 3: Maintenance record excerpt

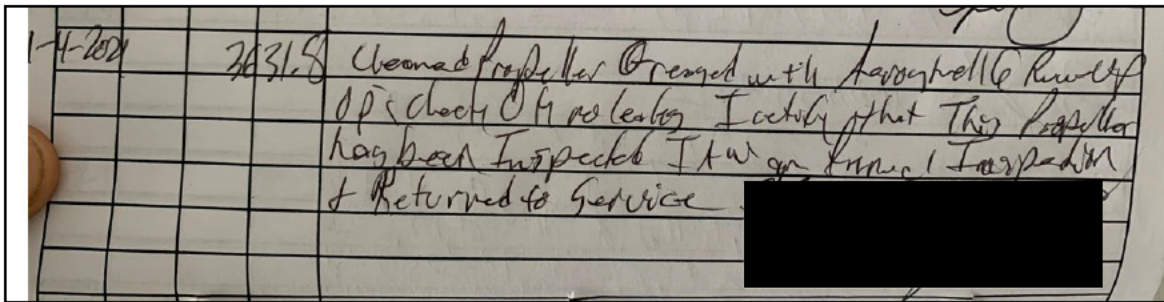


Figure 4: Maintenance record excerpt

DETAILS OF THE INVESTIGATION

The NTSB investigator-in-charge, FAA, and Air Tractor examined the wreckage at the accident site June 18-19, 2021. The on-site portion of the investigation concluded on June 20, 2021. The wreckage was recovered and secured at Atlanta Air Salvage in Griffin, GA. Investigative information, videos, and photographs were shared with the Party Members, a TSB Accredited Representative, and a Technical Advisor through the course of the investigation. The fact-finding portion of the investigation concluded in April 2022.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located on the property of the Kinston Drag Racing Strip. The wreckage impacted grass and a chain fence that ran parallel along the drag racing pavement. The wreckage was consistent with a near vertical impact. A postcrash fire was observed which damage portions of the left side of the fuselage and the left wing. All four corners of the airplane were located with the fuselage. The fuselage was oriented on about a 090° heading located at 35.231413, -77.635800.

The engine was located submerged in terrain under the fuselage and firewall.



Figure 5: View of the airplane at the accident site

Cockpit:

The single seat remained partially attached to the airframe. The top seat connection points remained attached, but the lower left side of the seat frame separated from the airframe. The shoulder harnesses were unbuckled and remained attached to the airframe. Both shoulder harness air bags were deployed. The lap belt and crotch belt were found unbuckled and remained attached to its attach points.

The power lever was found about mid-travel. The prop lever was found in a near full forward position. The condition lever was found near the ground idle position. The trim lever was found mid-travel.

The forward portion of the cockpit and instrument panel separated from the airframe but remained largely intact. Several of the instruments were damaged or read zero. The airspeed indicator displayed 94 MPH. The ITT gauge read about 900° C. Fuel pressure read 20 PSI and was in the green arc.

The fuel selector valve remained attached to the airframe. Both fuel lines remained connected to the valve. When a flashlight was shined into the valve, light was observed with the valve

found in the open/ ON position. The valve was able to be moved from the open to closed position normally. The linkage to the fuel selector valve had separated from its attach point.



Figure 6: View of the airplane at the accident site

Flight Controls

All flight control surfaces were located with the main wreckage. Flight control continuity was not established due to significant impact damage. All observed separations were consistent with overload and impact related damage.

Elevator

The elevator controls were manually operated by steel and aluminum pushrods connecting the control stick to the elevator control horns through two control idlers. The forward elevator pushrod was found connected to the control stick. The aft rod end bearing of the forward pushrod was found separated. The inner race of the rod end bearing remained attached to the idler. The elevator controls were found to be continuous from the forward idler to the elevator control horns. The right control horn was found attached to the fuselage and elevator torque tube. The left elevator control horn was found to have separated from the fuselage attach point. The control horn was found separated with the lower and forward ears remaining attached to

the aft elevator pushrod. The remainder of the control horn was found attached to the left elevator torque tube.

Rudder

The rudder controls were manually operated by a pair of stainless steel cables running directly from the rudder pedal assemblies to the rudder control horns. The rudder cables were found to be continuous from the rudder pedals to the rudder control horn.

Ailerons

The aileron controls were manually operated by steel and aluminum pushrods connecting the control stick to the aileron control horns through a torquetube and multiple bellcranks and idlers. In addition, the AT-402 ailerons incorporate a drooping feature that lowers both ailerons in conjunction with extension of the flaps. The aileron drooping controls are documented below under "Flap System".

The aileron controls were found continuous from the control stick to both fuselage mounted bellcranks. The inboard rod end of the right aluminum wing mounted pushrod was found separated from the pushrod, attached to the fuselage mounted bellcrank. The remainder of the pushrod was found to be continuous to the wing mounted bellcrank through rotation of the outboard end of the pushrod when the inboard end was rotated. The right aileron controls from the wing mounted bellcrank to the aileron control horn were found to be continuous.

The inboard rod end of the left aluminum wing mounted pushrod was found separated from the pushrod, attached to the fuselage mounted bellcrank. The aileron controls from the separation to the aileron control horn were found to be continuous through sympathetic movement of the inboard end of the aluminum pushrod when the left aileron control horn was moved.

Flap System

The flap actuator was found connected to the fuselage. The flap actuator motor was separated from the flap actuator. The flap actuator extension measured approximately 2.8" which corresponds to a flap extension of approximately 21°. The flap control system was found to be continuous to both flap control horns.



Figure 7: View of the flap jackscrew actuator

Fuel System

The fuel header tank was found ruptured. The fuel selector valve was found attached to the airframe. The valve was removed and determined to be in the "ON" position by shining a light through one port and viewing light out the other. The airframe fuel filter was found with impact damage. The filter housing was removed, drained, and found to contain a dirty liquid. The engine fuel heater was drained by positioning one of the fuel lines downward and found to contain approximately 3 oz. of clear liquid that smelled of fuel.

A white substance similar to a liquid found at other areas of the airplane was present at the bottom of the liquid. The engine driven low pressure fuel pump was removed and disassembled. A residual amount of fuel was found in the pump. The pump was rotated by hand and found to function normally.

Landing Gear

The left main gear spring was found attached to the fuselage with the left wheel separated. The left wheel was found near the left wingtip. The right main gear spring was found separated from the fuselage, near the fuselage attach location. The right wheel was found attached to the main gear spring. The tail gear was found attached to the aft fuselage with no discernable impact damage.

Wings

The left wing was co-located with the fuselage. The entire leading edge displayed aft crushing. The fuel cap remained installed and closed. The majority of the left wing sustained fire damage. The left rear spar was found attached to the fuselage attach point. The right rear spar was found separated from the fuselage attach point. The right rear spar attach bolt was found sheared. The aft portion of the bolt was found in the rear spar attach lug. The remainder of the bolt was not located in the wreckage.

The left wing was found partially consumed by heat/fire and with impact damage to the leading edge in the aft direction. The left flap was found attached to the wing with heat/fire damage. The left aileron was mostly consumed by heat/fire. The outboard end of the aileron was found co-located with the left wing. The inboard aileron hinge was found attached to the wing.

The right wing was found with crush damage to the leading edge in the aft direction. Crush damage was found in the forward direction consistent with impact with the right elevator approximately mid span along the trailing edge of the wing. The right flap was found attached to the wing. The right flap was found with crush damage at the inboard end consistent with contact with the fuselage and damage to the outboard end consistent with impact with the right elevator. The right aileron was found attached to the wing with crush damage to the inboard end consistent with impact with the right elevator.

Each of the wings were equipped to hold 117 gallons of fuel in the integral wing fuel tanks for a total of 234 gallons. The fuel tanks were found ruptured. Both fuel caps were found properly secured. Fuel was observed leaking from the right wing.

Empennage

The empennage surfaces were present at the aft end of the fuselage. The left horizontal stabilizer was found to have separated from the upper attach points. The aft arm of the left V-strut was found bent. The left elevator was found with heat/fire damage on the outboard leading edge. The right horizontal stabilizer was found attached to the fuselage. The right elevator was found with crush damage consistent with contact with the right wing.



Figure 8: View of the airplane at the accident site



Figure 9: View of the airplane at the accident site

ENGINE AND PROPELLER

The engine was confirmed to be a Pratt & Whitney PT6A-34AG, Serial Number PCE-PH0858. The engine was completely submerged beneath the terrain. Once removed, the engine displayed a significant amount of impact damage and some thermal damage from the postcrash fire. The rear portion of the engine, beginning at the accessory gear box area, had fractured from the forward portion of the engine.

A small cut was made by recovery personnel at the direction of the NTSB IIC near the forward section of the engine. Significant leading-edge gouging and debris was observed in the power section of the engine. Leading edge gouges and witness marks were observed on the stators. Compressor blade fragments had fractured and were located loose in the engine. The air intake section was crushed by impact forces.



Figure 10: View of the engine once removed from terrain



Figure 11: View of the engine once removed from terrain



Figure 12: Interior view of the engine



Figure 13: Fragments of internal core engine

The first stage compressor rotor blade tips displayed rubbing and burr material (red arrows in the photo below):



Figure 14: First stage compressor rotor blade

All three propellers separated from the hub and were located near the engine. One blade exhibited significant torsional bending. Each blade exhibited varying degrees of leading-edge gouges. One blade had pronounced leading edge gouges that were consistent with the length of the chain length fencing the airplane impacted.



Figure 15: View of all three propellers



Figure 16: View of a propeller blade displaying impact marks and measurements of a chain fence impacted by airplane

The fuel heater and associated fuel line remained partially attached. When the line was positioned downward, about 3 ounces of clear liquid that smelled of fuel drained from the line. A white substance that resembled liquid found on other areas of the airplane was also present in the liquid.

The airframe fuel filter assembly remained attached to the firewall. The canister was impact damaged contained a small amount of dirty liquid and debris.

The engine driven low pressure fuel pump remained installed to the accessory gear box. It was removed and disassembled. A residual amount clear fuel was present in the pump. The pump when rotated by hand and functioned normally.

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