National Transportation Safety Board
Office of Aviation Safety
Washington, DC 20594

ERA22FA149

AIRWORTHINESS FACTUAL REPORT

March 1, 2023

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A. ACCIDENT

Location:	Panama City, Florida
Date:	March 8, 2022
Time:	1846 central standard time 0046 UTC
Airplane:	Cessna 182, N182XT

B. AIRWORTHINESS FACTUAL REPORT

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C. SUMMARY

On March 8, 2022, at 1846 central standard time, a Cessna 182Q airplane, N182XT, was destroyed when it was involved in an accident near the Northwest Florida Beaches International Airport (ECP), Panama City, Florida. The private pilot and passenger were fatally injured. The airplane was operated by the pilot as a personal flight conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

D. DETAILS OF THE INVESTIGATION

The NTSB investigator-in-charge traveled to the accident site on March 9, 2022. The accident site and wreckage were documented on March 10, 2022, and the activities concluded with the recovery and transport of wreckage to Florida Air Recovery in Jacksonville, Florida. The investigation was assisted by a Textron Aviation and an FAA party member.

E. HISTORY OF FLIGHT

Review of Automatic Dependent Surveillance – Broadcast (ADS-B) data provided by the Federal Aviation Administration (FAA) revealed that the pilot completed a short 10 minute local flight at his home airport of Jack Barstow Airport

(IKW), Midland, Michigan, concluding at 1118 eastern standard time (1618UTC). Fuel records at the airport showed that at 1123, 19 gallons of 100-low lead were added. The cross-country flight originated from IKW at 1212 eastern standard time (1712UTC). The flight arrived at Warren County Memorial Airport (RNC), McMinnville, Tennessee at 1503 local central standard time (2103UTC) for a total time enroute of 3 hours and 51 minutes.

According to fuel receipts, the pilot added via the self-serve pumps, 74.2 gallons of 100LL. The pilot departed at 1554 CST (2154UTC). The last radar point received was at 1846 CST (0046 UTC), which resulted in a total flight time of 2 hours and 52 minutes. The total flight time for the day resulted in 6 hours and 53 minutes of flight time. Figures 1 and 2 show an overview of the flight track and ADS-B data overlayed with the final approach course.

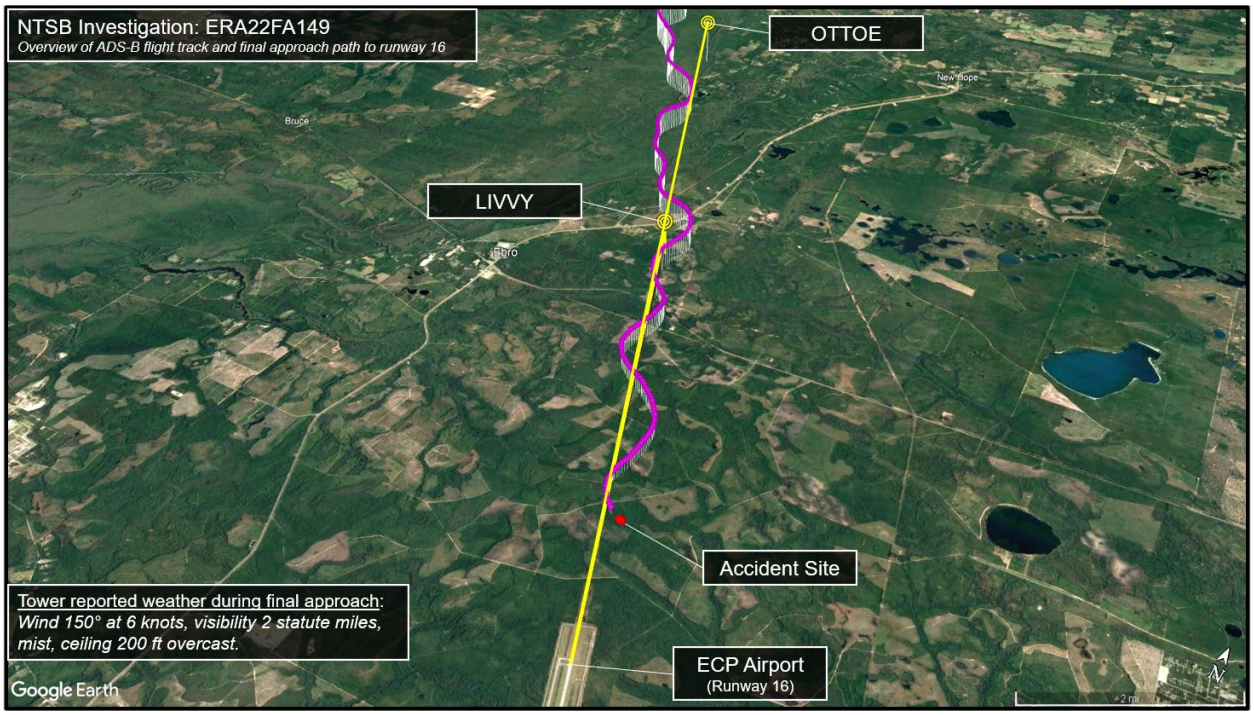


Figure 1: Overview of the final approach path for the ILS runway 16 approach at ECP Airport and the airplane's ADS-B track.

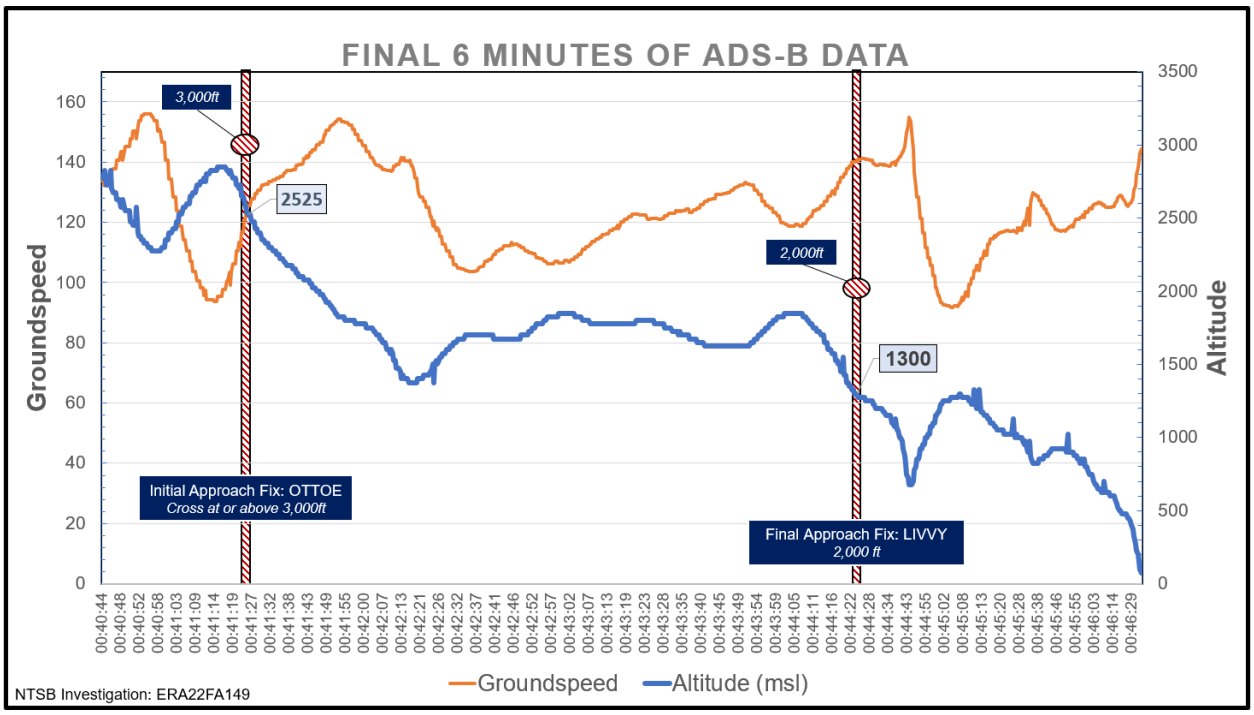


Figure 2: Final six minutes of ADS-B altitude and groundspeed data overlayed with waypoint information pertaining to the ECP ILS Runway 16 approach.

F. WRECKAGE AND IMPACT INFORMATION

The wreckage was highly fragmented and was oriented on a debris path of about 145° magnetic heading. It came to rest inverted in heavily wooded terrain and brush. The initial impact was associated with trees and fragments of wreckage that remained fixed in the trees. Several trees were struck in the debris path, which corresponded to about an 18-20° descent angle from the initial impact to the main wreckage. The main wreckage was located about 1.55nm from the runway 16 threshold.

All major components of the airframe and engine were located in the debris path. Flight control and trim cable continuities were confirmed from the cockpit to each flight control surface except for the aileron balance cable, which exhibited tension overload and splayed ends. There was no evidence of fire, and a strong odor of fuel was present.

G. AIRFRAME EXAMINATION

The right wing had separated from the fuselage and was located a few feet prior to the main wreckage. It displayed heavy impact damage. Its aileron had remained partially attached, separating at the center hinge. The remainder of the right aileron was located in the debris path. The right wing fuel strainer was clear. The right flap remained attached to the wing and was found in a retracted position. The flap actuator

located in the right wing was found in the full retracted position. The right wing strut was located forward of the wreckage in the debris path area. The fuel cap remained installed.

The left wing separated from the fuselage and was fragmented. The leading edge of the wing displayed a 12 inch diameter tree impact compression mark. The wing strut remained attached to the wing. The right flap remained attached to the wing and moved freely by hand along its tracks. Fragments of the aileron remained attached. Fuel remained in the left wing and its cap remained installed.

The fuselage had fragmented aft of the baggage area to the empennage. The horizontal and vertical stabilizers, elevator, and rudder remained attached to the fuselage. The elevator trim remained attached and measured approximately 1 inch and 5/8ths, which correlated to about 10° trailing edge up (nose up elevator trim).

The fuel selector valve remained attached to the airframe and it was found partially ported to the BOTH position. The fuel selector valve handle had separated from the valve. The valve operated normally in all positions when rotated by hand and was free of debris.

Both left and right cabin entry doors had separated from the airframe and were observed in the debris path.

The control columns and control wheel were impact damaged and had separated from the attach point area and was located in the cockpit.

The co-pilot seat remained partially attached to the airframe. The pilot seat had been moved by recovery personnel. The bench seat remained attached to the airframe. The front two seats had 5-point seat restraints which had been cut by recovery personnel.

The ELT remained attached to the airframe and was found in the armed position. It was an ACK Model E-04, 406Hz. It displayed a battery expiration of July 9, 2026.

The instrument panel sustained impact damage and some instruments remained attached. The airspeed indicator read 0 knots. The compass had separated from its attach point, and it was functional. The directional gyro was loose in the cockpit and displayed a heading of 170° and its heading bug was set to 210°. The secondary attitude indicator, which was electrically driven, was loose in the debris and its reading was not reliable. The altimeter was loose in the debris and sustained impact damage. It read 8,500 ft and its barometric pressure window was found set 29.88[1].

[1] The ECP controller provided an altimeter setting of 29.92 shortly before the accident. The difference in a barometric setting of 29.88 (versus 29.92), would have resulted in the altimeter displaying an altitude of about 40 ft lower as compared to if 29.92 had been set.

The horizontal situation indicator sustained impact damage and its instrument face and glass were cracked. The course deviation indicator was found set to 172° with a one dot deflection indicating the airplane was left of course. The heading bug was set to 150°. The glideslope deflection indicator was not visible.

The turn coordinator was loose in the cockpit and displayed beyond a standard rate turn to the right. The vertical speed indicator was loose in the cockpit and displayed a 200 ft per minute climb.

A Garmin 530 and 430 GPS units and transponder were found loose in the cockpit with impact damage. The primary attitude gyro indicator remained attached, and its vacuum air hose remained attached. The gyro casing and its internal components were loose and moved freely within the instrument casing. Its face was not readable due to impact damage.

An S-TEC 55 X autopilot mode control unit was found loose in the cockpit and displayed significant impact damage. An S-TEC altitude alerter was found separated in the cockpit with impact damage. In the tail compartment near the ELT an S-TEC component contained venting tubes and electrical wires, which remained connected to the unit.

A second autopilot mode control panel had fragmented, sustained significant impact damage, and was loose in the cockpit. The autopilot ON/ OFF toggle switch was found on. The altitude alert ON/ OFF toggle switch was found in a middle position that did not correspond to any setting. The ON/ OFF trim was found on, and the NAV 1/2 was found in the NAV2 position.

The VOR was set to 190°. The vacuum suction gauge was found off the normal indicating range. The digital clock remained installed. The JPI EDM 700 remained installed, was removed, and displayed impact damage to the aft connecting port area.

The right side of the instrument panel had fragmented from the left side. The flap selector was found in the 20° position. The cabin heat, cabin air, and defrost was found in the off position.

The ignition switches, alternator, and battery switches were ON. The pitot heat was ON. All aircraft lights were selected on. The primer was selected fully forward.

The throttle, mixture, and propeller levers were full forward. The carburetor heat lever was found partially extended.

The RPM gauge had fragmented, and its face was found in the cockpit. The manifold pressure gauge was loose in the cockpit and read 0. Loose engine instruments were located in the debris and their readings were unreliable.

The circuit breakers were all IN, with exception to the CABIN LIGHT and the alternator breaker was impact damaged.

H. ENGINE EXAMINATION

The engine was a Continental O-470 engine, serial number 470876. It was modified to a P. Ponk Aviation O-470-50 engine, serial number 3234, per the supplemental type certificate SE4985NM. The propeller was a three bladed Hartzell propeller. Its spinner was removed, and the serial number was noted as HP854B, and the model was PHC-G3YF-1RF.

The engine sustained impact damage, most concentrated in the forward left and underside of its casing. It had separated from its mounts and airframe and was found a few feet forward of the cockpit. Evidence of fresh cut pine tree branches were observed covering the rear top cylinders.

The engine was able to be rotated manually by hand with a crowbar through 360° of movement. Crankshaft, camshaft, and accessory reduction gear continuity was demonstrated. Thumb-compression of varying degrees was displayed on each cylinder.

The top spark plugs were removed, examined, and displayed combustion signatures consistent with normal wear when compared to the Champion Aerospace Aviation Check-A-Plug chart.

Each cylinder was examined with a borescope. Each valve displayed varying degrees of carbon deposit build-up, however, no cylinder or piston head displayed mechanical damage and each cylinder was free from any large debris.

The accessory section of the engine which normally contains an engine driven vacuum pump displayed evidence of a component that fractured from the engine. It's drive gear operated normally when the engine was rotated. A vacuum pump was not located in the debris.

The throttle body and carburetor had separated from the engine. It showed impact damage and had mud and debris inside the intake area. It smelled of fuel. The butterfly valve operated normally. The throttle body lever remained attached.

The magnetos remained attached to the engine, however the right magneto displayed impact damage and was partially attached. When removed and rotated by the use of a powered drill, spark was observed on the leads that had been cut for examination.

The three bladed propeller had sheared from the propeller flange and was located a few feet forward of the main wreckage. The blades exhibited varying degrees of blade polishing, leading edge gouging, chordwise scratches, s-bending, and torsional twisting.

I. MAINTENANCE HISTORY

The airplane's maintenance records revealed that an annual inspection was performed on July 1, 2021. The total airframe time at that inspection was 5879.7 hours, and the tachometer time was 1936.9 hours. The engine's time since overhaul was noted as 90.1 hours. According to a paper record located in the aircraft wreckage, as of March 3, 2022, the tachometer time was recorded as 1982.9.

The engine was overhauled on June 16, 2020. The maintenance records showed that the most recent entry was on January 24, 2022. A flexible engine intake duct hose was replaced. This was replaced due to an intake fire that occurred during an over priming event.

Several recent entries were related to an ongoing issue with the autopilot, S-TEC 55X. According to individuals familiar with the airplane and individuals who have had discussions with the accident pilot, with autopilot on, and altitude hold (ALT HOLD) selected on, the altitude would begin to oscillate, and could reach 1,500 feet per minute changes in altitude, up and down. The autopilot never had any difficulty being disconnected. All other modes of the autopilot functioned normally. The maintenance records showed autopilot discrepancies and corrective actions ranging from October 2020 through January 21, 2022.

According to the Avionics Manager at 45 North Avionics, Traverse City, Michigan, the last time the airplane had undergone maintenance at their shop was in late January 2022. The pilot picked up his airplane and departed on January 31, 2022.

According to an avionics discrepancy record, the corrective actions completed in order to release the airplane involved multiple tasks. The transducer was sent out for repair, and no faults were found. The pitch trim servo was removed and sent for repair at the factory. The factory replaced the motor, and the unit was reinstalled on the airplane. The flight control cable tensions were checked via a test flight. The autopilot programmer computer was sent to the factory for repairs. The capacitor was replaced, and the accelerometer was adjusted. Subsequent to these actions, a functional ground test was performed, and the autopilot system operationally was signed off.

After the accident pilot departed with his airplane from the maintenance shop on January 31, 2022, he called the shop and reported that the porpoise and altitude deviations while on altitude hold still persisted. The pilot returned to the shop on February 14, 2022, in his airplane.

In addition to the original porpoise issue not being resolved, the owner reported that the elevator trim wheel was a little stiffer than before the trim actuator and pitch trim servo replacements. The pilot advised that he had performed autopilot/ trim system troubleshooting on his own, although the specifics of his actions were not relayed to the maintenance manager. The pilot indicated that the programmer/ computer for the autopilot now displayed a fault, but the manual elevator trim wheel operation was normal. The pilot did not have an appointment for service, and the shop could not immediately evaluate the airplane, thus, the pilot decided to depart and return at a later time. There is no record that any additional maintenance had been performed after late January 2022.

According to people who spoke with the pilot the weekend before the accident cross-country flight, the pilot told them that he was still having autopilot problems, but he felt comfortable flying the long trip hand flown without the autopilot. A friend had asked the pilot, "are you comfortable flying without autopilot and single pilot that far?" The accident pilot's exact statement, according to this individual was, "yeah I'll be fine."

The below is a summary of maintenance endorsements located in the airframe logbooks:

On September 22, 2021, the pitch servo was removed and sent for repair. On October 16, 2020, the autopilot pitch trim servo was sent out for bench check and repairs.

On July 1, 2021, as part of an annual inspection, the autopilot transducer was reinstalled after troubleshooting.

On October 13, 2021, a factory repaired S-TEC pitch servo, altitude pressure transducer was installed, and an operational check was passed.

On November 2, 2021, the autopilot programmer computer was removed and sent to the factory for repairs.

On December 3, 2021, a factory repaired autopilot computer (S-TEC 55X) was reinstalled after an operational check was passed.

On December 8, 2021, the elevator trim actuator was replaced with a new Textron Aviation part.

On January 21, 2022, again, a factory repaired autopilot computer (S-TEC 55X) was reinstalled after an operational check was passed. A pitch trim servo was repaired and reinstalled.

J. SUMMARY

There was no evidence of preimpact mechanical malfunction with the airframe or engine.

K. PHOTOGRAPHS

Photo 1: Overview of the empennage

Photo 2: View of the empennage and fragments of wing

Photo 3: View of the fragmented cockpit area

Photo 4: View of multiple trees displaying impact related damage.

Photo 5: View of the cockpit and fuselage during recovery operations

Photo 6: View of the autopilot, altitude alerter, and elevator trim ON/ OFF mode control panel

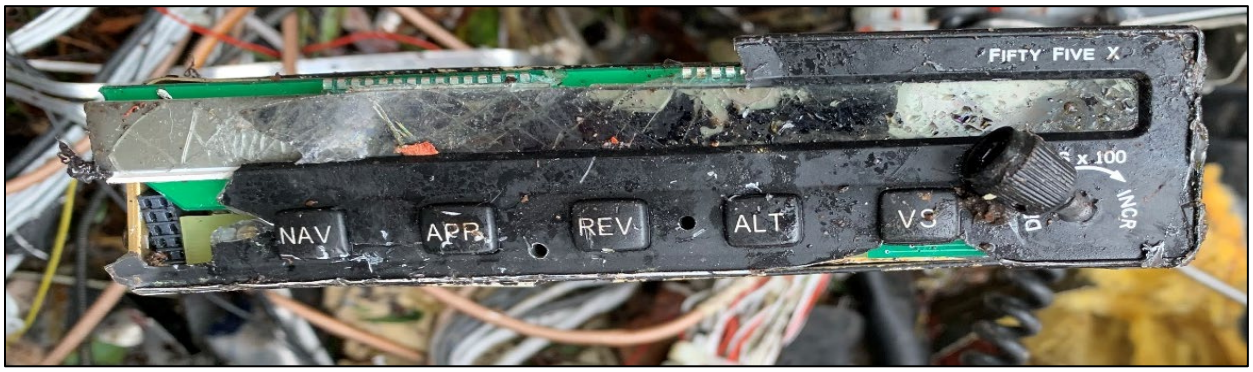
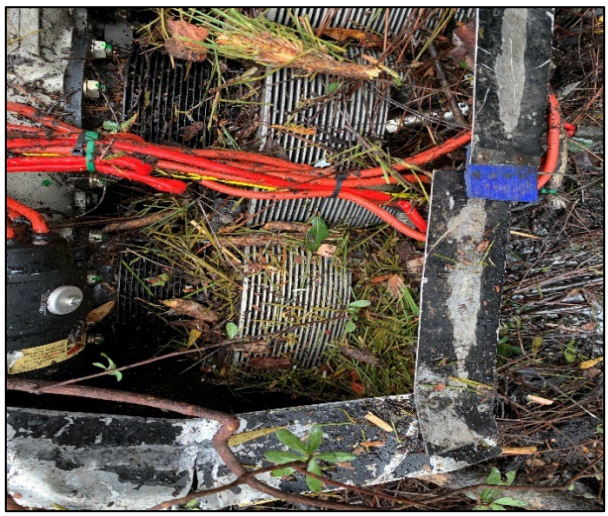
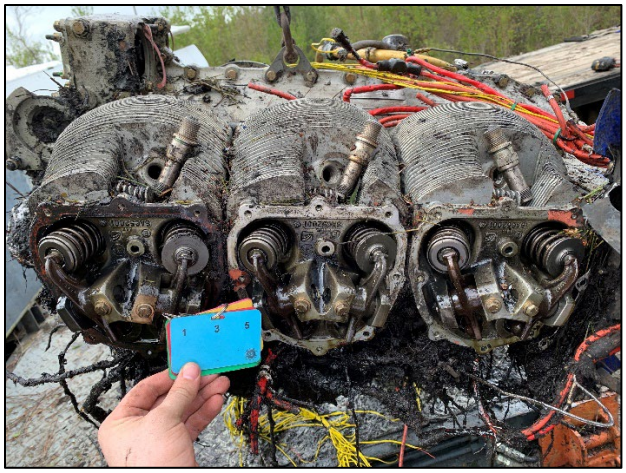
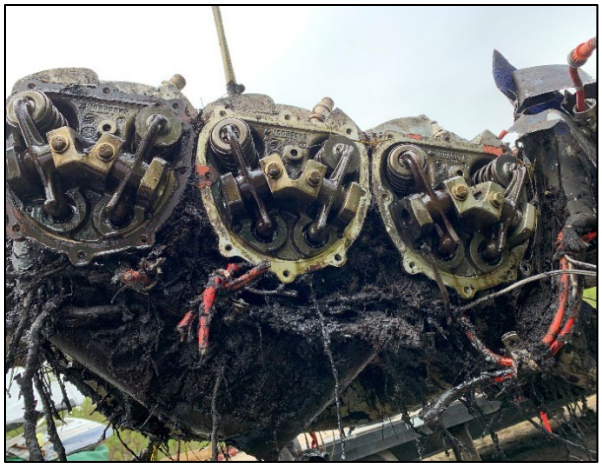


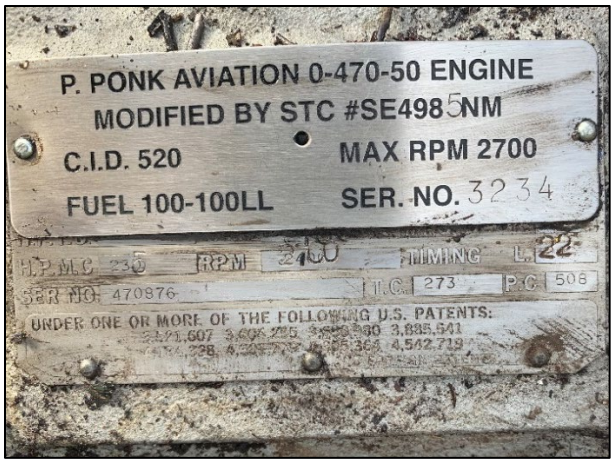
Photo 7: View of the autopilot STEC-55X mode control panel

Photo 8: View of small chopped up pine tree debris located spread across the top and rear of the engine.









Photos 9-14: View of the engine, propeller, at the accident site

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