

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24FA270

INVESTIGATIVE SUPPLEMENTAL MATERIAL

ACCIDENT

Location: Augusta, Montana
Date: August 08, 2024
Time: 1200 mountain daylight time
Airplane: Cessna 182K

INVESTIGATIVE SUPPLEMENTAL MATERIAL

IIC Zoë Keliher
National Transportation Safety Board
Portland, Oregon

Party Member 
Textron Aviation
Wichita, Kansas

HISTORY OF FLIGHT

On August 08, 2024, about 1255 mountain daylight time, a Cessna 182K, N2764Q, was substantially damaged when it was involved in an accident near Augusta, Montana. The pilot and two passengers were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 personal flight.

A review of Federal Aviation Administration (FAA) automatic dependent surveillance-broadcast (ADS-B) information identified that the airplane departed from Pullman Moscow Regional Airport, Pullman, Washington about 1120. Following departure, the airplane continued on an east-northeast heading and maintained an altitude between 7,500 and 8,000 ft mean sea level (msl). The airplane's ADS-B track ended when it entered mountainous terrain in the southernmost portion of the Bob Marshall Wilderness. The last ADS-B return was located about 25 nm southwest of the accident site.

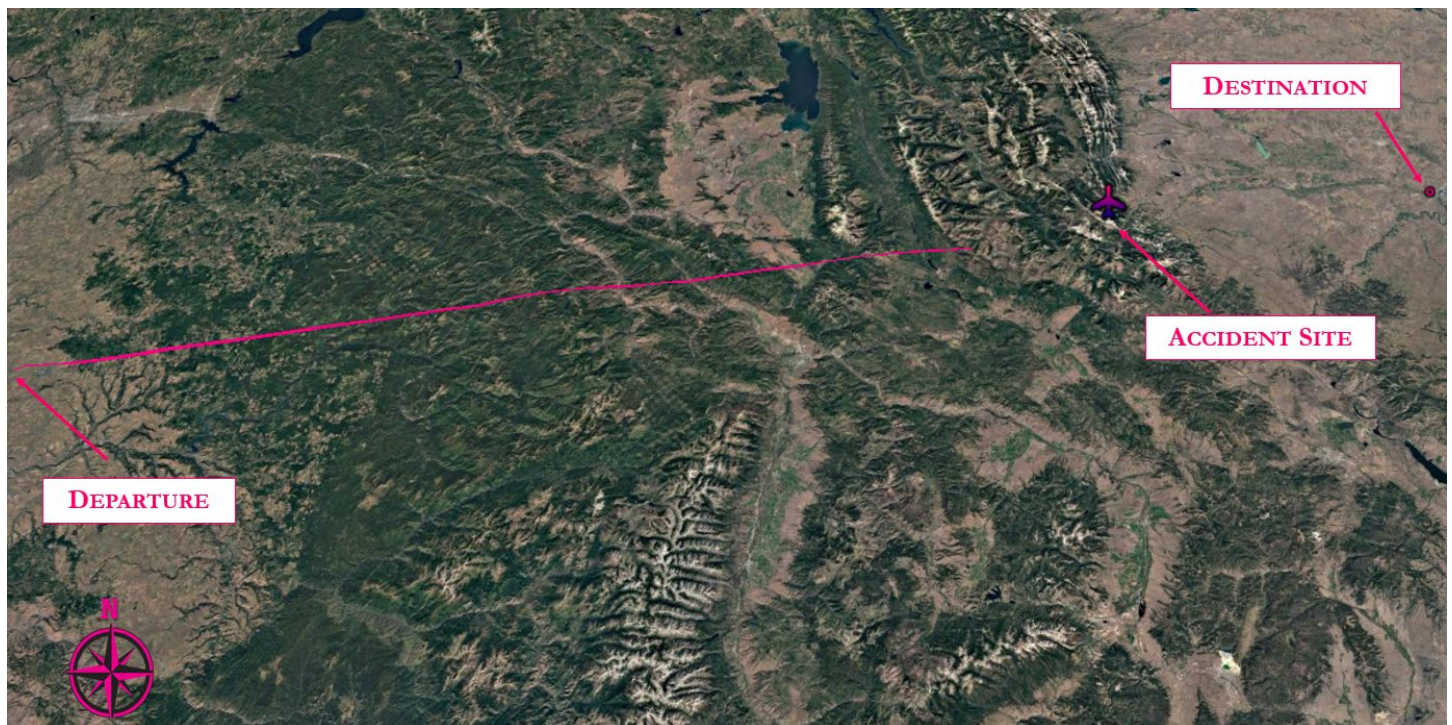


Figure 1: Flight track identified from the ADS-B

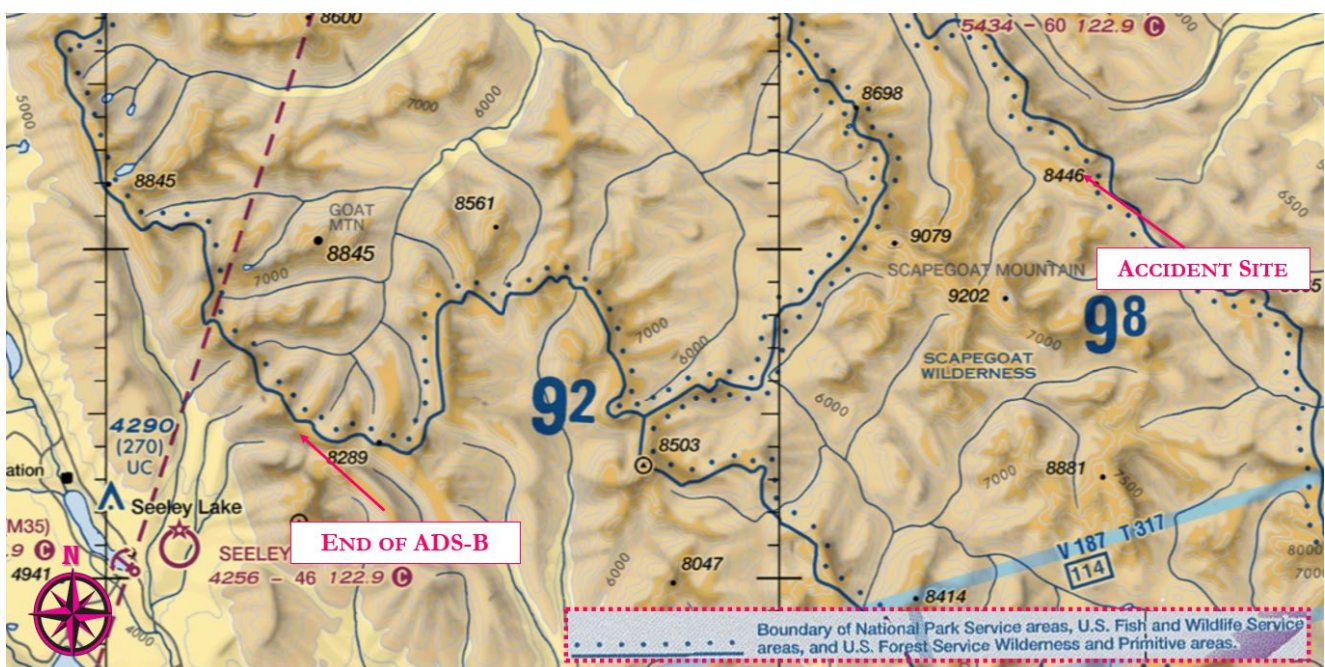


Figure 2: Flight section from the end of the ABS-B information to the accident site from sectional

An Appareo Stratus 3 portable electronic device was recovered from the airplane wreckage at the accident site. The recorded data included the entire accident flight, which started at 11:20:00 and ended at 13:01:48. The airplane made a direct flight from the departure airport over lower mountainous terrain before crossing near Seely Lake and flying through higher mountainous terrain in the Bob Marshall and Scapegoat Wilderness areas of the Rocky Mountains.

The flight track revealed that as the airplane continued eastbound through increasingly higher terrain, it began making turns to follow the lowest available terrain ahead, while progressively descending as it travelled further east. The airplane made about seven turns with greater 45-degree heading changes before entering a pass at the eastern edge of the mountain range.

WRECKAGE AND IMPACT

The accident site was located in a rugged, mountainous canyon 17 nautical miles west of Augusta, Montana, at coordinates 47.369797/-112.766089. The terrain consisted of loose scree beneath firmer ledges and rocky outcrops, bisected by a gradual central gully with forest vegetation. The south canyon wall reached an elevation of 8,450 feet, while the north wall, known as Crown Mountain, peaked at 8,400 feet. The airplane came to rest on a steep south-facing slope at an elevation of 7,550 feet.

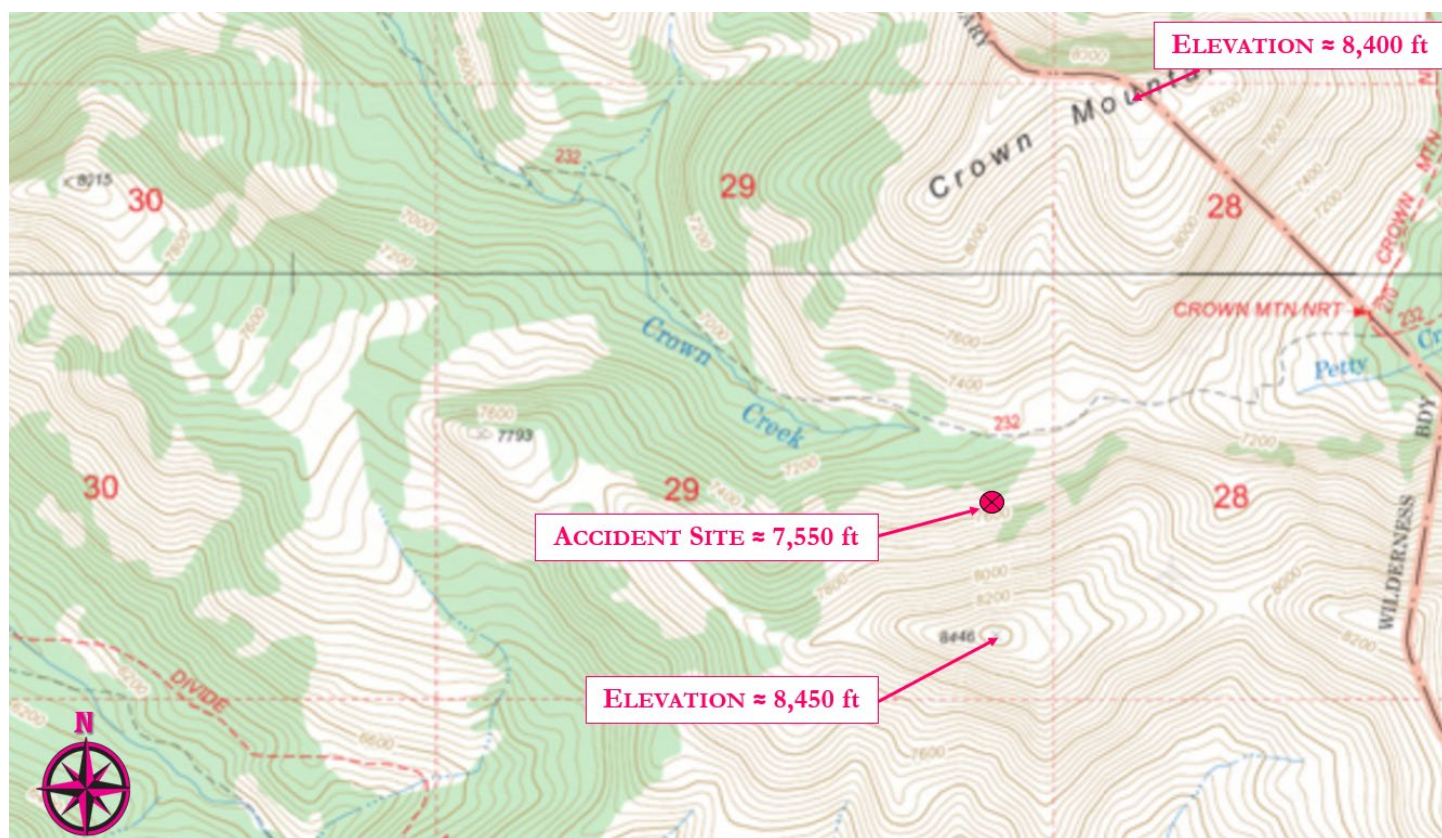


Figure 3: Accident site showing surrounding elevation

The airplane's nose was oriented upslope on a magnetic bearing of approximately 140°. The wreckage was scattered over a 90-foot area, with the most distant debris, primarily windscreen fragments, located east of the main wreckage. The main wreckage, which included all major control surfaces, was found 800 feet below the cliff's top and 625 feet above the canyon floor. The fuselage and inboard sections of the wings had been consumed by fire.

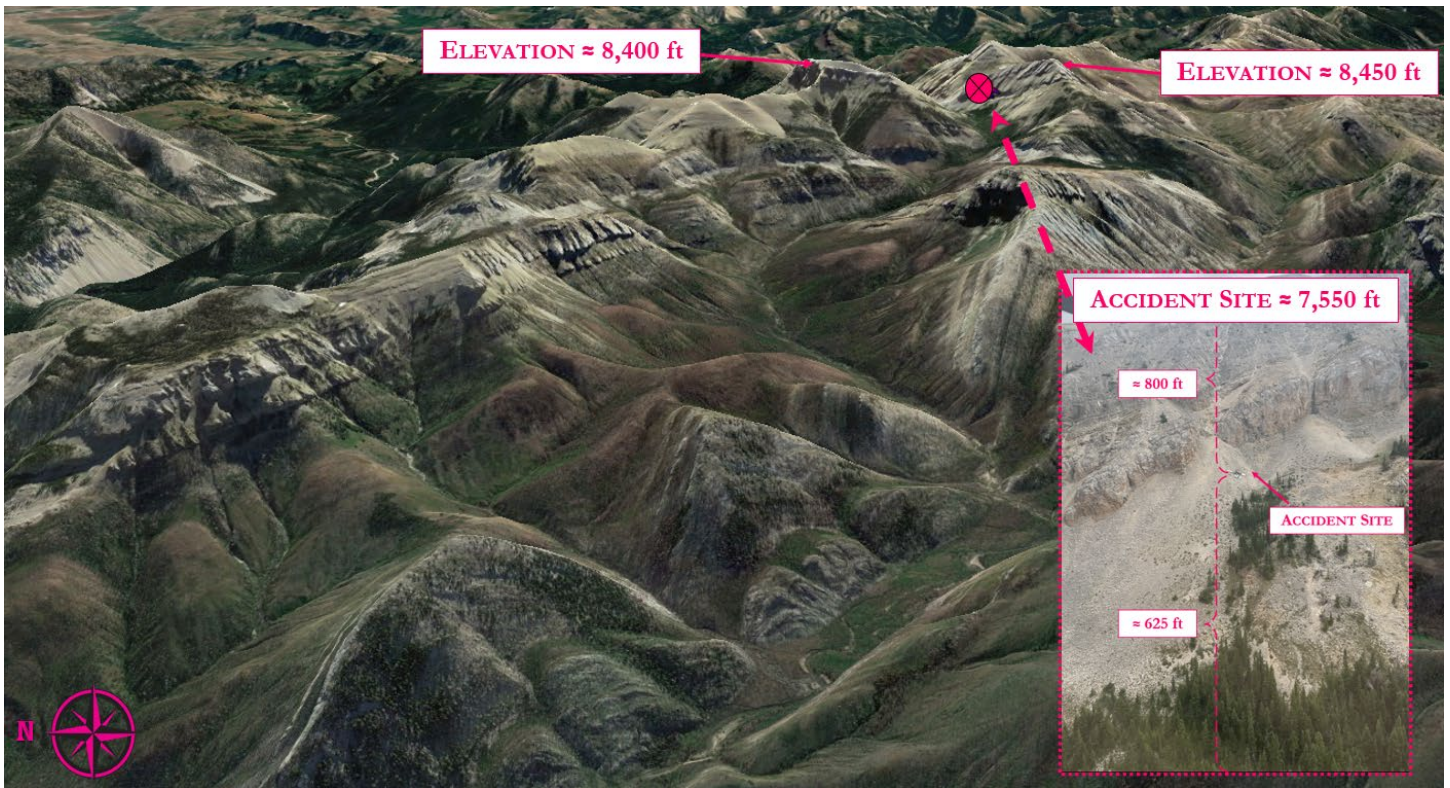


Figure 4: Accident site location

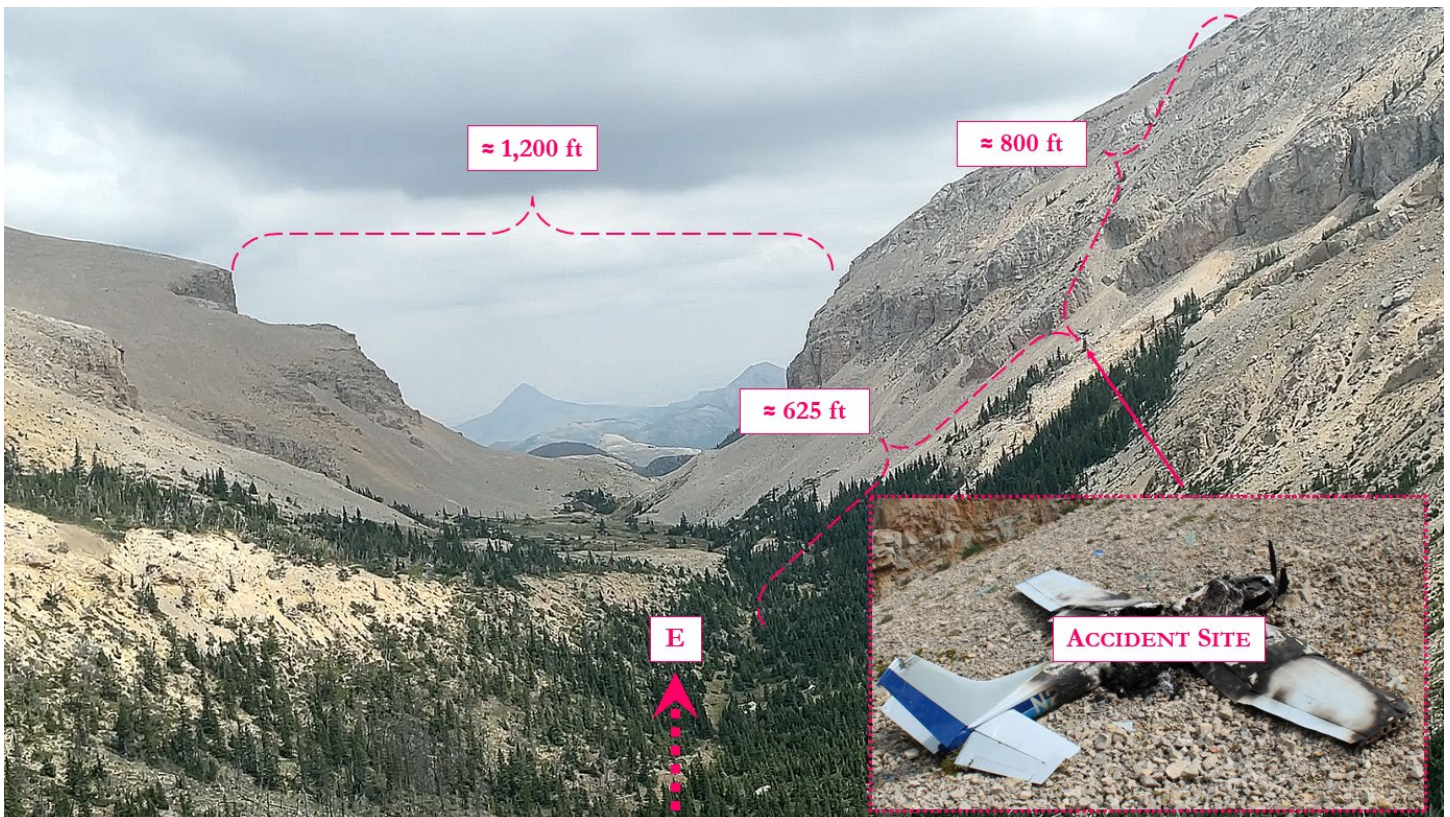


Figure 5: Accident site in reference to surrounding terrain

Within the debris field, fragments of red and blue/green plastic lens covers were found east and west of the main wreckage, respectively, consistent with the wings impacting the terrain with the airplane in a nearly level attitude. The farthest piece of wreckage, a windscreen fragment, was located 90 feet from the main wreckage on a heading of 040°. The left door was found 35 feet downslope from the main wreckage, with the latch still in the closed position.

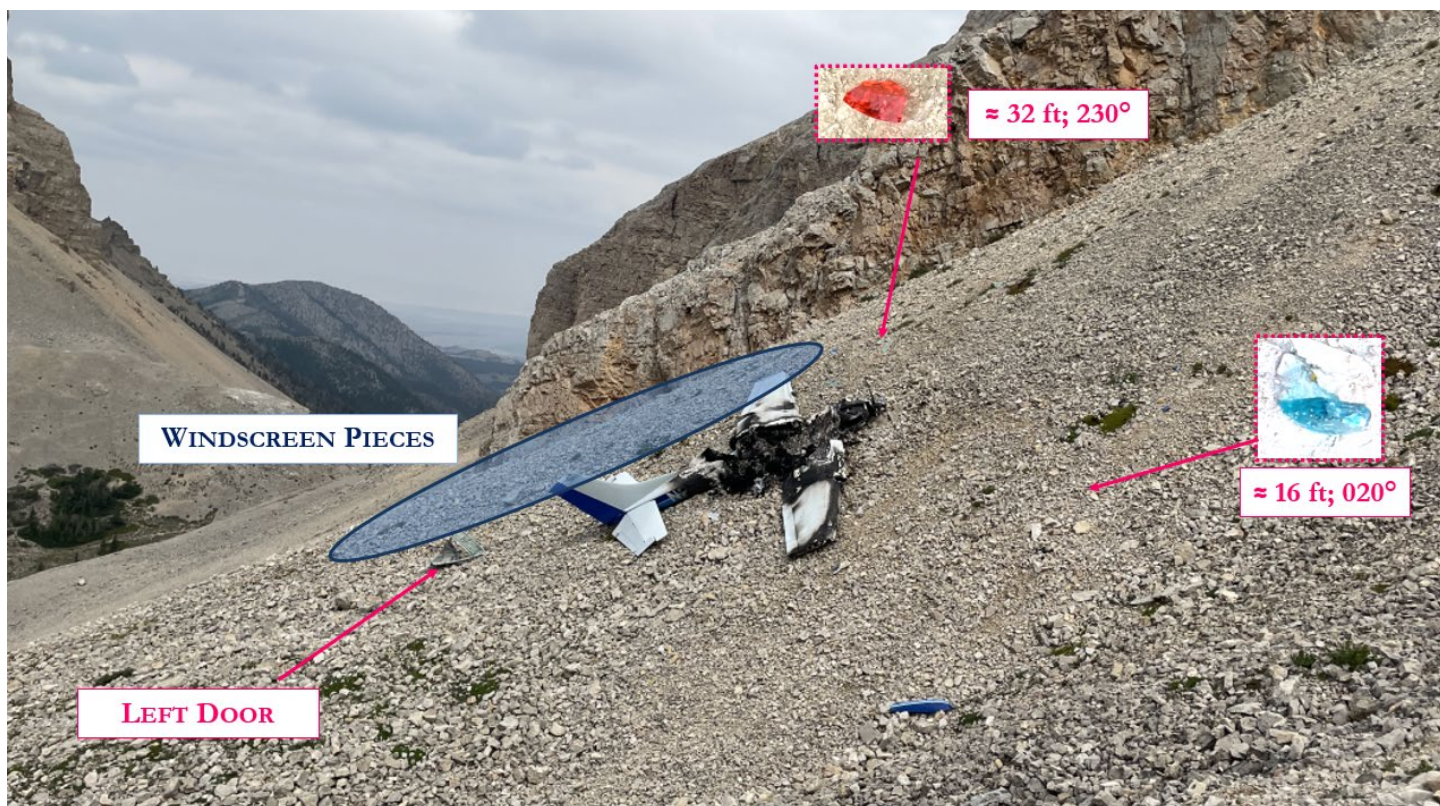


Figure 6: Accident site showing position lights

AIRFRAME

The airplane's data plate identified it as a Cessna 182K, serial number 18257964.

The right and left wing came to rest upright and the flap and aileron control surfaces remained attached at their respective hinges. The leading edges of both wings sustained aft crush damage with the bottom wing incurring the most damage. The skin folded over on itself in an accordioned appearance. The right aileron direct cable was continuous from the right cable drum in the cockpit to the bellcrank. The left aileron direct cable was continuous from the left cable drum in the cockpit to the bellcrank. The carry-through cable was attached to the right bellcrank and continuous to the left bellcrank, where it was secured. The flaps cables were attached at the drive pulley. Investigators measured the flap actuator extension, which the Textron representative stated was consistent with the flaps fully retracted.

The elevator cables were connected in the cockpit, continuous through the fuselage, and attached at the aft bellcrank. The push-pull tube was connected to the aft bellcrank (mounted on the aft bulkhead and to the elevator control arm).

The rudder cables were attached in the cockpit and were continuous through the fuselage to their respective arms on the rudder horn; the pulleys throughout the airframe were consumed by fire. The rudder stops were intact with no evidence of deformation.



Figure 7: Wreckage

Portions of the seat frame and base components were identified within the burned wreckage. There were no intact seat assemblies and all upholstery and foam components were consumed by fire. Fragments of the seat rails were also present, but no positions could be discerned.

There were two lap belt buckles found in the latched position, while the shoulder harness buckles were found unlatched and loose within the wreckage.

ENGINE

The Continental Motors O-470- R, serial number 815944-R, a Rayjay turbocharger was installed in 1983. The airplane was equipped with a Continental Motors O-470- R engine, serial number 815944-R. A Rayjay turbocharger was installed in 1983.

An external examination of the engine revealed no evidence of a catastrophic failure. The most concentrated heat distress was at the accessory case, and the entire carburetor was melted. Investigators removed the upper spark plugs from all cylinders; they were light gray in color. According to the Champion Aviation Check-A-Plug AV-27 Chart, these spark plug signatures corresponded to normal engine operation. Rocker covers were removed, and oil was present at each location. Valves and rockers appeared normal. Inspection of all cylinders revealed no foreign object damage, no evidence of detonation, and no indication of excessive oil consumption.

The carburetor and attachment linkage were not observed. The induction system was thermally damaged in the carburetor location. What appeared to be a thermally damaged turbo wheel was observed in the wreckage near the induction system.

The cockpit engine controls were observed to be in the fully-forward position.

The most concentrated heat distress was at the accessory case with the entire carburetor melted.

PROPELLER

The Hartzell PHC-G3YR-1RF three propeller blades remained in the hub and were bent aft. All three propeller blades exhibited damage including bending, leading-edge damage, and chordwise scoring. The outboard 12 inches of blade A had fractured and separated and displayed scoring and leading-edge gouging consistent with contact with rocky terrain. Blade B was bent aft at the midspan. Blade C remained generally straight but exhibited chordwise scoring and leading-edge gouging. The spinner was crushed in the area adjacent to blade A.

RECORDS

The last annual inspection of the airplane was recorded as being completed on March 18, 2024, at a total time of 3200.4 airframe hours and 275.7 hours since major engine overhaul.

Fuel records indicated 30.81 gallons of 100LL fuel was sold to the pilot in Pullman, Washington at 1012 on the morning of the accident flight.

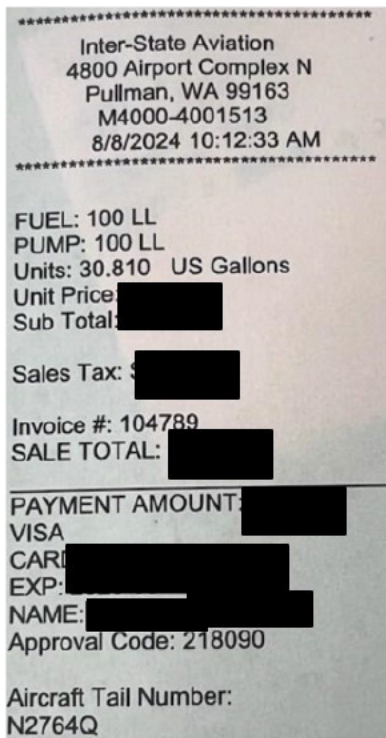


Figure 8: Fueling receipt

PERSONNEL INFORMATION

PILOT

[REDACTED]¹

[REDACTED] (family friend): [REDACTED]

Wife is [REDACTED]

Owns roofing company

Pilot MID [REDACTED] Pilot Certificate [REDACTED] (PRIVATE PILOT ASE;), was a 46-year-old male. This pilot reported civil flight experience that included 149 total and 13 hours in last six months as of exam dated 2/7/2024. This pilot was 70 inches tall and weighed 225 lbs. at the time of the last exam. The last exam was conducted by

¹ [https://www.facebook.com/\[REDACTED\]](https://www.facebook.com/[REDACTED])

Aviation Medical Examiner (AME) 11056. This pilot was issued a Third Class Medical Certificate without limitation.

The pilot purchased the airplane on March 28th, 2022. In social media posts the pilot did not appear to wear shoulder harnesses.

WEATHER INFORMATION

Altimeter Setting to Pressure Altitude

Altimeter Setting [☒ in/hg ☐ hpa] :	30.19
Field Elevation [☒ ft ☐ mt] :	7550
Pressure Altitude (ft) What is the formula?	7280

Pressure Altitude to Density Altitude

Pressure Altitude [☒ ft ☐ mt] :	7280
True Altitude (ft)	7550
Standard (ISA) Temperature [☐ °C ☒ °F] :	32.09
Air Temperature (OAT) [☐ °C ☒ °F] :	75
Density Altitude (ft) What is the formula?	10112

Weather Station ID: KMTAUGUS18
Station Name:The Cabin On Mortimer Creek
Latitude / Longitude:47.615° N, 112.77° W
Elevation:4997

Time	Temperature	Dew Point	Humidity	Wind	Speed	Gust	Pressure	Precip. Rate.	Precip. Accum.	UV	Solar
11:49 AM	52.4 °F	47.3 °F	83 %	West	0.7 mph	2.0 mph	29.98 in	0.00 in	0.00 in	0	85.5 w/m ²
11:54 AM	52.4 °F	47.1 °F	82 %	WSW	0.2 mph	1.7 mph	29.98 in	0.00 in	0.00 in	1	117.6 w/m ²
11:59 AM	53.1 °F	47.3 °F	81 %	East	0.3 mph	0.9 mph	29.98 in	0.00 in	0.00 in	1	121.9 w/m ²
12:04 PM	53.4 °F	47.6 °F	81 %	ESE	0.1 mph	0.6 mph	29.98 in	0.00 in	0.00 in	0	75.1 w/m ²
12:09 PM	53.1 °F	47.3 °F	81 %	WSW	0.4 mph	1.2 mph	29.98 in	0.00 in	0.00 in	0	49 w/m ²
12:14 PM	52.5 °F	47.6 °F	83 %	West	0.6 mph	2.6 mph	29.98 in	0.00 in	0.00 in	0	37.8 w/m ²
12:19 PM	52.1 °F	47.8 °F	85 %	WSW	0.0 mph	0.5 mph	29.98 in	0.00 in	0.00 in	0	38.8 w/m ²

Weather Station ID: KMTAUGUS24

Station Name:Six Point

Latitude / Longitude:47.294° N, 112.752° W

Elevation:2984

Time	Temperature	Dew Point	Humidity	Wind	Speed	Gust	Pressure	Precip. Rate.	Precip. Accum.	UV	Solar
12:39 PM	74.3 °F	48.0 °F	39 %	East	2.8 mph	4.0 mph	29.86 in	0.00 in	0.00 in	5	1220.3 w/m²
12:44 PM	74.4 °F	47.6 °F	39 %	East	3.7 mph	4.9 mph	29.86 in	0.00 in	0.00 in	5	63 w/m²
12:49 PM	73.6 °F	46.0 °F	37 %	ESE	3.5 mph	4.3 mph	29.87 in	0.00 in	0.00 in	5	1212.6 w/m²
12:54 PM	73.6 °F	47.9 °F	40 %	ENE	4.3 mph	6.5 mph	29.86 in	0.00 in	0.00 in	5	1208.7 w/m²
12:59 PM	73.7 °F	49.3 °F	42 %	NE	4.3 mph	5.5 mph	29.86 in	0.00 in	0.00 in	4	415.1 w/m²
1:04 PM	73.8 °F	48.9 °F	41 %	East	4.3 mph	5.9 mph	29.86 in	0.00 in	0.00 in	5	50.8 w/m²
1:09 PM	74.0 °F	46.9 °F	38 %	East	5.7 mph	7.7 mph	29.86 in	0.00 in	0.00 in	4	1200.9 w/m²
1:14 PM	73.9 °F	46.9 °F	38 %	ESE	4.5 mph	5.6 mph	29.86 in	0.00 in	0.00 in	4	1200.9 w/m²
11:49 AM	73.7 °F	48.2 °F	41 %	NE	2.5 mph	4.0 mph	29.87 in	0.00 in	0.00 in	4	1021.7 w/m²
11:54 AM	72.4 °F	46.0 °F	39 %	East	5.6 mph	7.1 mph	29.87 in	0.00 in	0.00 in	4	1185.4 w/m²
11:59 AM	72.6 °F	46.6 °F	40 %	East	3.1 mph	4.1 mph	29.87 in	0.00 in	0.00 in	4	1189.3 w/m²
12:04 PM	73.0 °F	48.1 °F	41 %	NE	4.1 mph	5.2 mph	29.87 in	0.00 in	0.00 in	4	1027 w/m²
12:09 PM	73.0 °F	48.2 °F	41 %	ENE	4.8 mph	6.1 mph	29.87 in	0.00 in	0.00 in	4	1030.1 w/m²
12:14 PM	73.4 °F	48.7 °F	42 %	East	3.6 mph	4.7 mph	29.87 in	0.00 in	0.00 in	4	1197 w/m²
12:19 PM	73.7 °F	47.7 °F	40 %	East	4.1 mph	5.1 mph	29.87 in	0.00 in	0.00 in	4	1204.8 w/m²

Surface Observations

At 0853 an Automated Surface Observing Station (ASOS) located at the departure airport, Pullman/Moscow Regional Airport (PUW), reported winds from the east at 8 knots, visibility of 10 statute miles or greater, and clear skies. The Terminal Area Forecast (TAF) for PUW called for VFR weather with light easterly winds, excellent visibility, and mostly clear skies with only a few high clouds above 25,000 feet agl throughout the 24-hour period.

At 1253, an Automated Surface Observing Station (ASOS) located at the destination, Great Falls International Airport (GTF), which is located about 57 miles west of the accident site at an elevation of 3,680 feet, reported

variable wind at 5 knots with gusts to 15 knots, visibility of 10 statute miles or greater, a few clouds at 3,400 feet above ground level (agl), and a ceiling of broken clouds at 8,000 feet agl. The TAF at GTF called for morning fog and low stratus clouds (IFR/LIFR), changing to VFR by midday with mainly scattered mid to high clouds and east-northeast winds 10–20 knots becoming gustier in the afternoon.

The National Weather Service's (NWS) Great Falls, Montana, Weather Forecast Office issued an Area Forecast 1140, applicable for the region that included the accident location. The aviation section discussion stated, "Lingering low clouds will be the main concern this TAF period. Otherwise scattered showers and perhaps an isolated thunderstorm or two will be around this afternoon and evening, mostly over terrain. Mountains will be obscured where low clouds linger, primarily across Central and portions of Southwest Montana."

The FAA Aviation Weather Handbook (FAA-H-8083-28A) describes "mountain obscuration" as an aviation hazard category. The handbook defines it as areas where mountains are widely hidden by clouds, precipitation, or fog such that VMC cannot be maintained. It lists clouds, precipitation, haze, mist, and fog as the causes. The National Weather Service's graphical forecast documentation explains that GFA products depict marginal VFR/IFR conditions where low clouds and fog reduce ceilings below 3,000 ft and/or visibility below 5 miles, conditions that frequently first appear or persist in terrain-channeled valleys and passes due to localized upslope and gap airflows. Operationally, this means that upsloping mountain passes and valleys are common locations for low stratus, fog, and resulting localized MVFR/IFR conditions, even within areas of broader VFR weather.

High-Resolution Rapid Refresh (HRRR) Model Sounding

The HRRR model provides 3-kilometer resolution data including radar reflectivity, precipitation forecasts, wind patterns, temperature, humidity, and severe weather indices to help predict storms, turbulence, and other weather hazards.

A HRRR model sounding along the airplane's flight path and in the immediate area of the accident indicated overcast clouds were present from near the surface to about 10,000 feet msl.

The Area Forecast, GFAs, HRRR sounding, and weather conditions reported by eyewitnesses were consistent in indicating that cloud ceilings were below, and therefore clouds obscured, the mountain peaks and ridges. This effect became progressively more so as one travelled further east into higher terrain, where the data indicated there was a likelihood of clouds/mist reaching valley floors, especially in the higher mountain pass areas.

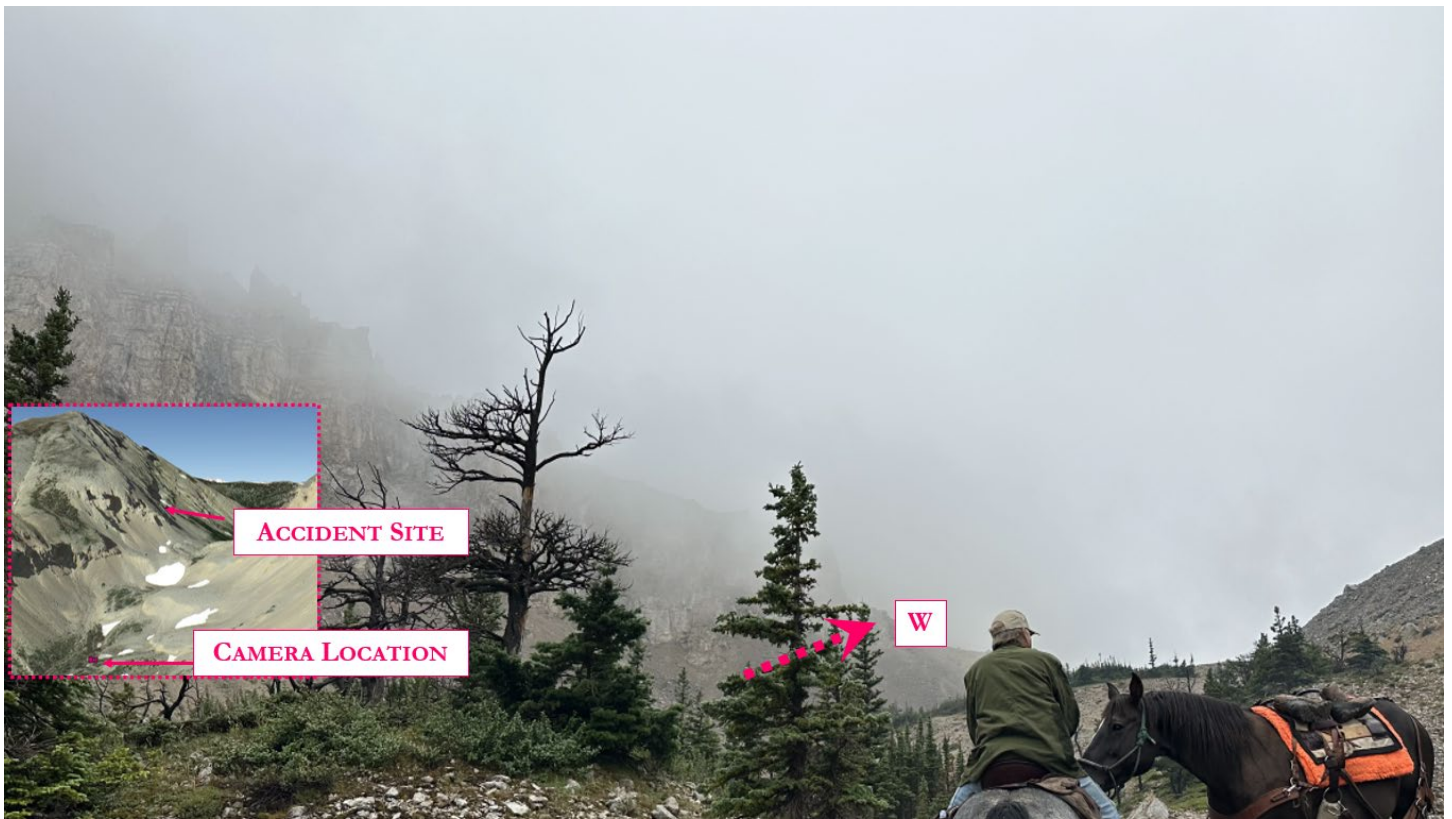


Figure 9: Picture from after the accident