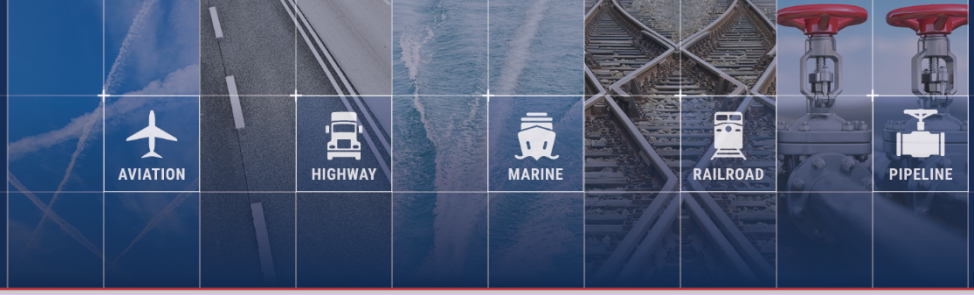

Aviation Investigation Factual Report

Location:	Eden, Utah	**Accident Number:**	WPR21FA211
Date & Time:	May 29, 2021, 10:00 Local	**Registration:**	N1727T
Aircraft:	TEXTRON AVIATION INC 172S	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

On May 29, 2021, about 1000 mountain daylight time, a Cessna 172S airplane, N1727T, was destroyed when it was involved in an accident near Eden, Utah. The flight instructor and student pilot were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to the airplane operator, ATP Flight School (ATP), the accident flight was an introductory training flight designed to assess the student pilot's skill level. Federal Aviation Administration automatic dependent surveillance-broadcast (ADS-B) data showed that the flight departed ATP's local base at Ogden-Hinckley Airport (OGD), Ogden, Utah, about 0941 and immediately turned onto an easterly heading. The ADS-B data ceased 5 miles east of the departure airport about 0946, when the airplane entered Ogden Canyon at an altitude of 6,600 ft mean sea level (msl), which was about 1,000 ft above ground level (agl). The airplane was subsequently tracked by radar 9 miles east of OGD starting about 0949. The airplane flew south and then turned northwest while maintaining an altitude of about 2,000 ft agl. About 0955, the airplane turned to the northeast into a canyon where it began a climb over rising terrain. The last ADS-B targets showed that the airplane maintained an altitude of about 7,550 ft msl (1,000 ft agl), as shown in figure 1. At that altitude, the airplane would have been below ridgelines on both sides of its flightpath, as shown in figure 2. The ADS-B track data ceased at 0956:40.

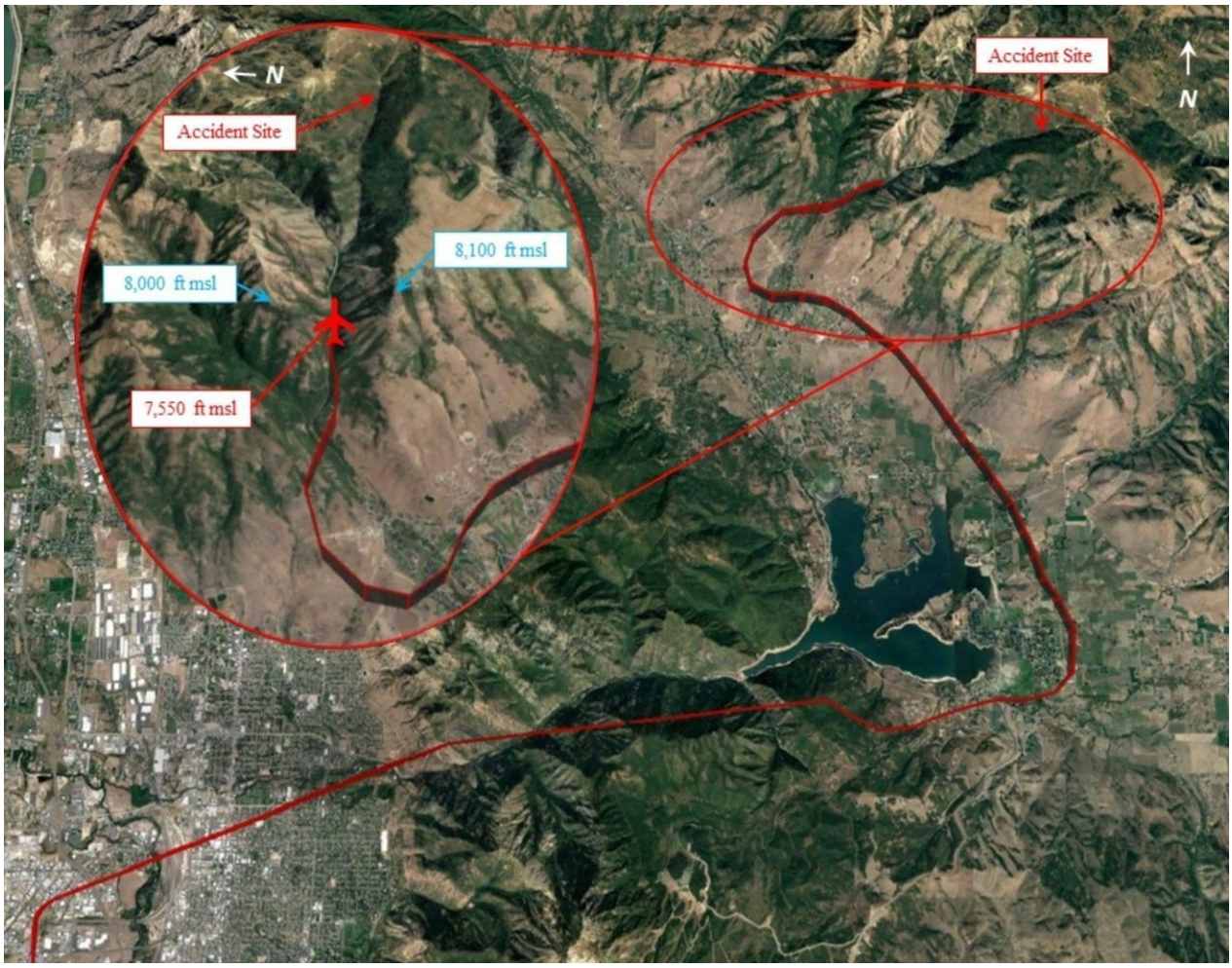

Figure 1. Flight track of accident airplane.

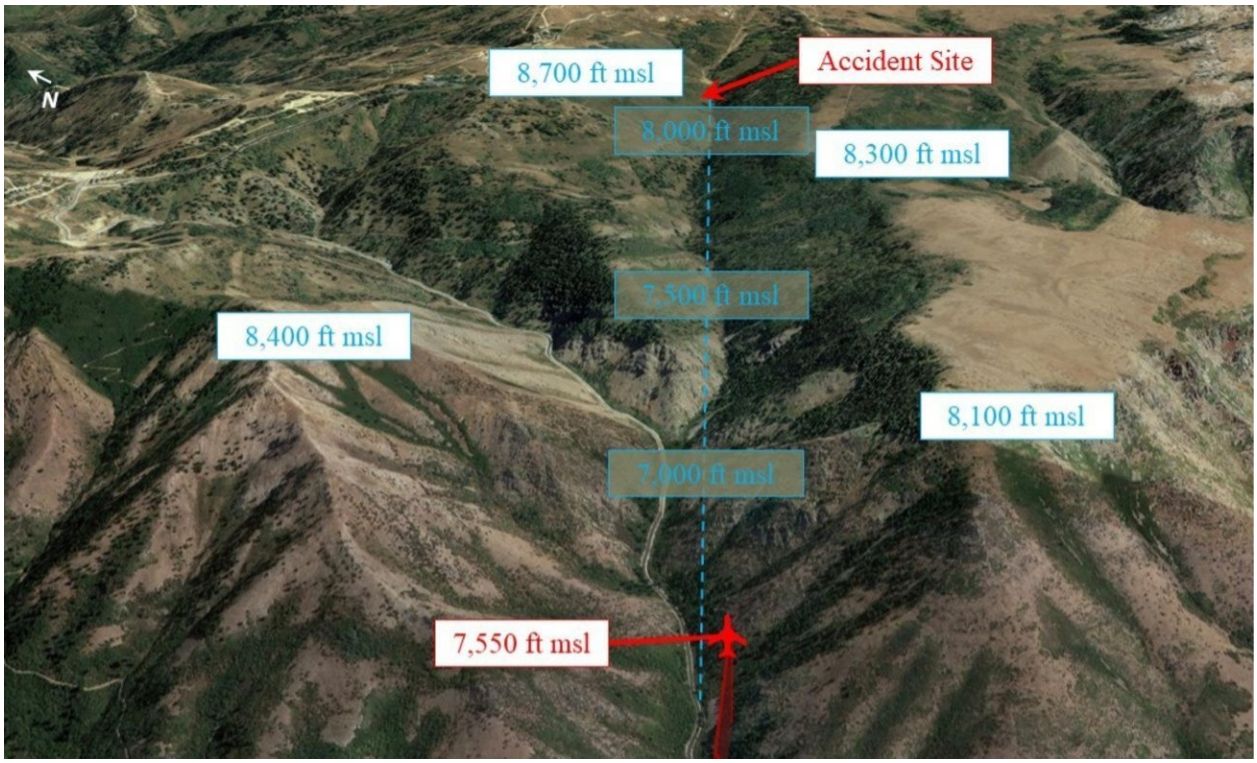

Figure 2. Canyon topography.

The airplane crashed in a valley between two mountain peaks positioned on a northerly heading. A postimpact fire ensued. A Weber County sheriff's deputy arrived on scene after receiving a call about a potential airplane crash. He could see smoke as he approached the scene. After arriving on scene, the sheriff's deputy saw the pilot, who appeared to be badly burned with a head injury. The pilot was able to answer questions at that time. According to the sheriff's deputy, the pilot stated that he "got caught in a downdraft."

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	21,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):		**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	August 12, 2019
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 28, 2020
Flight Time:	(Estimated) 311 hours (Total, all aircraft), 311 hours (Total, this make and model)		

According to ATP, the flight instructor began training with the school in January 2020, about 6 months after his introductory training flight. He subsequently completed the school's professional pilot course, including his certified flight instructor instrument certificate and multiengine instructor add-on. In November 2020, the flight instructor completed the school's indoctrination course, which was focused on company practices and procedures.

The flight instructor started working with students at ATP in December 2020. He instructed a total of 17 students between that time and the date of the accident, including the student pilot during the accident flight. Of those 17 students, 5 were participating in an introductory training flight. Of the four introductory training flights that preceded the accident flight, one involved a student who had no flight experience. The flight instructor demonstrated some maneuvers for that student and did not allow him to fly.

The flight instructor had not taken any of his previous introductory training flight students to Powder Mountain, the location where the accident took place. Those introductory training flights mostly took place about 20 to 30 miles northwest of the airport near the salt flats and over Salt Lake.

The flight instructor who was primarily responsible for training the accident pilot (through his private pilot certificate, instrument rating, commercial single-engine land certificate, and commercial multiengine land add-on) recalled that the pilot "worked hard and prepared well for each lesson." The flight instructor noted that he "never worried about the accident pilot falling behind" and that the accident pilot's skill "would not lead him [the flight instructor] to believe that he [the accident pilot] would have flown over Powder Mountain for an introductory flight." Another instructor who completed about 10 flights with the accident pilot stated that he "excelled at each stage check."

Aircraft and Owner/Operator Information

Aircraft Make:	TEXTRON AVIATION INC	**Registration:**	N1727T
Model/Series:	172S	**Aircraft Category:**	Airplane
Year of Manufacture:	2017	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	172S12056
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 13, 2021 100 hour	**Certified Max Gross Wt.:**	2550 lbs
Time Since Last Inspection:	91.1 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3006 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C126 installed, activated	**Engine Model/Series:**	IO-360-L2A
Registered Owner:	FLIGHT OPERATIONS AIRCRAFT LLC	**Rated Power:**	180 Horsepower
Operator:	FLIGHT OPERATIONS AIRCRAFT LLC	**Operating Certificate(s) Held:**	None

The airplane's weight and balance at the time of the accident was computed with a basic empty weight of 1,696 lbs, a combined flight instructor and student pilot weight of 469 lbs, and a fuel weight of 318 lbs, resulting in an estimated ramp weight of 2,483 lbs and takeoff weight of 2,475 lbs (both of which were less than the airplane's maximum gross weight). The airplane's estimated center of gravity was near the top of the normal category envelope.

The airplane's rate of climb was calculated using performance charts from the manufacturer's pilot's operating handbook. The calculations assumed a 2,550-lb gross airplane weight and an estimated ambient temperature of 12°C (which was based on the airplane's last recorded altitude of 7,550 ft msl and the 10°C ambient temperature at that point along with the factored standard lapse rate). The calculations showed that, under normal operating conditions, the airplane required a minimum of 2 minutes 49 seconds to climb 1,000 ft (to about 8,750 ft msl) to overfly the mountain peak ahead of the airplane's flightpath. This calculation also assumed that the airplane did not exceed an indicated airspeed of 72 to 73 knots. At this airspeed and distance to the mountain peak (based on the airplane's last radar point), the airplane would have reached the peak in 3 minutes 31 seconds.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KOGD,4439 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	09:53 Local	**Direction from Accident Site:**	229°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	/ None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	18°C / -4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ogden, UT (OGD)	**Type of Flight Plan Filed:**	None
Destination:	Ogden, UT (OGD)	**Type of Clearance:**	Unknown
Departure Time:	09:30 Local	**Type of Airspace:**	Class E

The 0600 upper air sounding wind profile indicated wind speeds of about 10 knots by 7,000 ft msl 20 knots from 14,000 ft msl and above. A sounding analysis indicated the possibility of mountain wave conditions about 10,000 ft msl with updraft and downdraft speeds of about 500 ft per minute near the accident site.

The area discussion forecast for the Salt Lake City area stated that a northwest wind was anticipated through daytime hours with some high clouds and visual flight rules conditions throughout the day. This forecast did not indicate any potential for mountain wave activity on the day of the accident. No significant meteorological information advisories, airmen meteorological advisories, or center weather advisories were active for the time of the accident.

The pilot did not receive weather information for the accident flight from Leidos flight service. No evidence indicated that the pilot requested weather information from ForeFlight before the accident flight.

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	Unknown
Ground Injuries:		**Aircraft Explosion:**	Unknown
Total Injuries:	2 Fatal	**Latitude, Longitude:**	41.361298,-111.75961

The airplane was located in a valley between two mountain peaks positioned on a northerly heading and was consumed by postimpact fire. The accident site was located at a field elevation of about 8,000 ft msl. All major sections of the airplane were accounted for at the accident site. The debris field was small and comprised mostly windshield fragments. The first point of impact was marked by a tree located 30 ft west of the main wreckage.

Flight control continuity for the elevator and rudder was traced from the cockpit to their respective control surfaces. The aileron flight control cables were traced from the left and right wing roots to the respective bellcranks. The cockpit was destroyed by postcrash fire, and the left and right aileron control cable sections from the cockpit to the wing roots were not identified.

The elevator trim actuator measured 1.37 inches, consistent with a 5° trim tab upward deflection, and the flap actuator displayed 0.25 inches of exposed jackscrew, consistent with the flaps in the retracted position.

The engine was damaged by postcrash fire. Mechanical continuity was established throughout the rotating group, valve train, and accessory section as the crankshaft was manually rotated at the propeller. Thumb compression was achieved at cylinder Nos. 2 and 4, and the valves displayed normal lift when the crankshaft was rotated. Cylinder Nos. 1 and 3 exhibited low compression, and the valves displayed some lift during rotation, but the push rods and shrouds were damaged by fire. The magnetos were also damaged by fire and could not be rotated by hand. All eight spark plugs were gray in appearance, consistent with normal wear. Examination of the interior components of the engine using a lighted borescope revealed no indications of catastrophic failure.

Both propeller blades remained attached to the crankshaft at the propeller flange. One propeller blade was bent toward the blade face about midspan and was partially melted at the blade tip. The other propeller blade was bent aft at the blade root.

The postaccident examination of the recovered portions of the airplane revealed no preimpact mechanical anomalies or malfunctions with the airframe or engine that could have precluded normal operation.

Medical and Pathological Information

The pilot was transported to a hospital where he died. Toxicology testing by the Utah Department of Health detected the short acting anesthetic ketamine in the pilot's hospital blood. Morphine, fentanyl, lorazepam and midazolam were not detected by the Utah Department of Health; however, they were detected in the toxicology testing performed by the FAA Forensic Sciences Laboratory on postmortem blood.

FAA toxicology testing did not detect any ethanol or drugs of abuse in the student pilot's blood.

Additional Information

ATP Flight School Mountain Training

Several ATP instructors stated that the flight school's curriculum did not include any mountain flying practical training. and most of those instructors could not recall if that subject was covered in the company's written training materials. Some flight instructors stated that they integrated basic mountain flying concepts, such as downdrafts, updrafts, and turbulence, into their practical training while flying through Ogden Canyon. One flight instructor stated that he would discuss mountain flying with students because of the topography in the area.

According to ATP's corporate office, for mountain flying, the school's curriculum references Federal Aviation Administration publications such as the *Pilot's Handbook of Aeronautical Knowledge* and Advisory Circular 00-06B, Aviation Weather, both of which are described below.

Pilot's Handbook of Aeronautical Knowledge

The handbook version that was in effect at the time of the accident presented limited information on mountain flying. References to meteorological phenomenon encountered in

mountain environments were captured in a risk management tool for pilots to assess the flight risks according to four categories, one of which was “environment.” Severe turbulence and downdrafts in mountain terrain were briefly mentioned in that part of the checklist. Downdrafts were also referenced in relation to turbulence and ground obstructions that affect the flow of wind. The handbook stated the following:

> *While the wind flows smoothly up the windward side of the mountain and the upward currents help to carry an aircraft over the peak of the mountain, the wind on the leeward side does not act in a similar manner. As the air flows down the leeward side of the mountain, the air follows the contour of the terrain and is increasingly turbulent. This tends to push an aircraft into the side of a mountain….*
>
> *Due to the effect terrain has on wind in valleys or canyons, downdrafts can be severe. Before conducting a flight in or near mountainous terrain, it is helpful for a pilot unfamiliar with a mountainous area to get a checkout with a mountain qualified flight instructor.*
>
> Advisory Circular 00-06B

The FAA’s aviation weather advisory circular was last updated about3 years before the accident. The advisory circular defined a mountain wave as “an atmospheric wave disturbance formed when stable air flow passes over a mountain or mountain ridge.” The advisory circular explained that mountain waves were a form of “mechanical turbulence” caused by obstructions to the wind flow.

ATP Flight School Introductory Training Flight Curriculum

The introductory training flight curriculum was a one-page document that listed both ground and flight training. Among the flight training items were positive transfer of flight controls, taxiing, straight-and-level flight, climbs, descents, and turns. The objective of the training was to determine if the candidate demonstrates “an attitude and ability to be successful” in ATP’s airline career pilot program. The curriculum did not list destinations for the introductory training flight.

Several ATP flight instructors reported that do not take flight student candidates to Powder Mountain during introductory training flights. Some instructors stated that the 1-hour introductory flights would not provide enough time to fly over Powder Mountain and return to the airport.

A popular route for introductory flights (and flight training) was to fly to Pineview Reservoir. Flight instructors would depart OGD toward the mouth of Ogden Canyon, where they would begin a circling climb. The instructors stated that they would enter the canyon at or just below the tops of the ridgeline (about 7,500 ft msl and higher). As previously stated, ADS-B data

showed that the accident flight instructor entered the mouth of Ogden Canyon at an altitude of about 6,600 ft msl.

Administrative Information

Investigator In Charge (IIC):	Stein, Stephen
Additional Participating Persons:	Troy Helgeson; Lycoming Engines; Williamsport, PA Ricardo Asensio; Textron Aviation; Wichita, KS Jim Koziarski; ATP Flight School; Jacksonville Beach, FL
Report Date:	December 15, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=103166