Aviation Investigation Final Report

Location:	Eagle Mountain, Utah	**Accident Number:**	WPR18FA186
Date & Time:	June 28, 2018, 10:54 Local	**Registration:**	N320MF
Aircraft:	Cessna 320	**Aircraft Damage:**	Destroyed
Defining Event:	Aerodynamic stall/spin	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Aerial observation		

Analysis

The pilot was conducting an aerial photography flight at a planned altitude of 7,255 ft over a level area just west of rising mountainous terrain. The planned flight was to accomplish 3 photo runs over the area. At the conclusion of the 3 runs, the pilot was to return to the airport located to the east for fuel. Onboard data indicated that at the conclusion of the second run traveling from west to east, the airplane made a shallow right turn to the southeast and continued toward mountainous terrain and in the general direction of the airport. After traveling over mountainous terrain, the airplane initiated a left turn at an altitude about 800 ft above the terrain. This turn was possibly performed to maneuver the airplane back to the northwest to the photo area and accomplish the final photo run. During the turn, the airplane's bank angle increased as the airplane climbed slightly and accelerated; the last recorded data showed the airplane at 177 knots groundspeed in an approximate 70° left bank. On site wreckage documentation revealed that the airplane collided with the terrain in a near vertical nose-down attitude suggesting that the airplane exceeded its critical angle of attack and aerodynamically stalled at an altitude too low for the pilot to recover from.

Examination revealed no anomalies with the airframe and engines that would have precluded normal operation, and damage signatures indicated that the engines were producing power at the time of the accident.

The pilot had several airspace violations in the year before the accident. A psychological evaluation conducted over 15 years before the accident, when the pilot first sought Federal Aviation Administration medical certification, indicated that the pilot had an "impulsive personality" and that he "sought excitement;" however, outside of these instances, there was no other information available that provided insight into the pilot's behavior or decision-making. It could not be determined whether the pilot's mental health contributed to this accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The pilot's exceedance of the airplane's critical angle of attack and the airplane experiencing an aerodynamic stall at too low an altitude to recover.

Findings

Aircraft	Angle of attack - Capability exceeded
Personnel issues	Aircraft control - Pilot
Aircraft	Altitude - Not attained/maintained
Environmental issues	Mountainous/hilly terrain - Not specified

Factual Information

History of Flight

Maneuvering	Loss of control in flight
Maneuvering	Aerodynamic stall/spin (Defining event)
Maneuvering	Collision with terr/obj (non-CFIT)

On June 28, 2018, about 1054 mountain daylight time, a Cessna 320D, airplane, N320MF, was destroyed when it was involved in an accident near Eagle Mountain, Utah. The airline transport pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 aerial photography flight.

The pilot was scheduled to perform aerial photography over level terrain located west of Lake Mountain. (See figure 1.) The elevation of the survey area was about 4,840 ft mean sea level (msl); Lake Mountain rises in elevation to about 7,600 ft. The pilot was to complete three photo runs before landing at Provo Municipal Airport (PVU), Provo, Utah for fuel. The planned altitude of the flight while conducting the photography was 7,255 ft msl. The route the photo runs are flown was determined by the pilot.

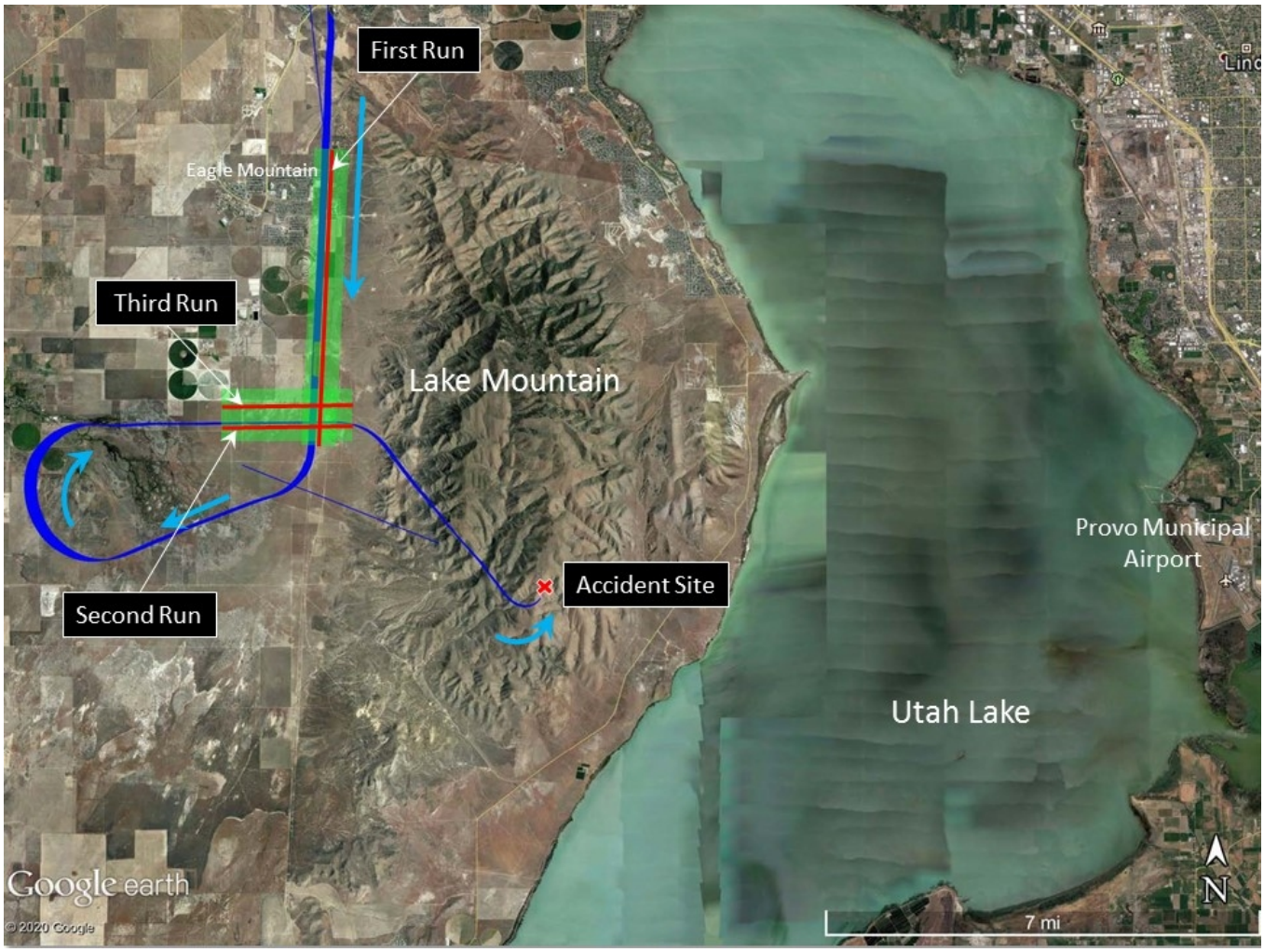

Figure 1-Flight data and highlighted photograph area.

The flight data showed the airplane at an altitude of 7,325 ft msl as it traveled east, then south along the west side of Lake Mountain, entering the first of three planned photo runs. The first run was about 5 miles long. After exiting the first run, the airplane departed the area to the southwest, then continued the right turn until reaching an easterly heading. The second run was entered from the west and was about 2 miles long, ending near the foothills of Lake Mountain. The pilot conducted the second run with a groundspeed between 169 and 194 knots at an altitude of 7,325 ft msl. Following the second run, the airplane reached the foothills of Lake Mountain and turned right to a southeasterly heading. The third run was similar to the second run and was not flown. As the airplane headed southeast, the groundspeed decreased to about 152 knots while its altitude remained constant, about 7,300 ft msl. About 1/2 nautical mile west of the accident site, the airplane entered a left turn. During the turn, the airplane's bank angle increased, its groundspeed increased from 158 kts to 177 kts, and its altitude increased from 7,283 ft to 7,401 ft msl. The last data point was located 840 ft above and about 1/4 mile south of the accident site and depicted the airplane in a 71° bank. (see figure 2)

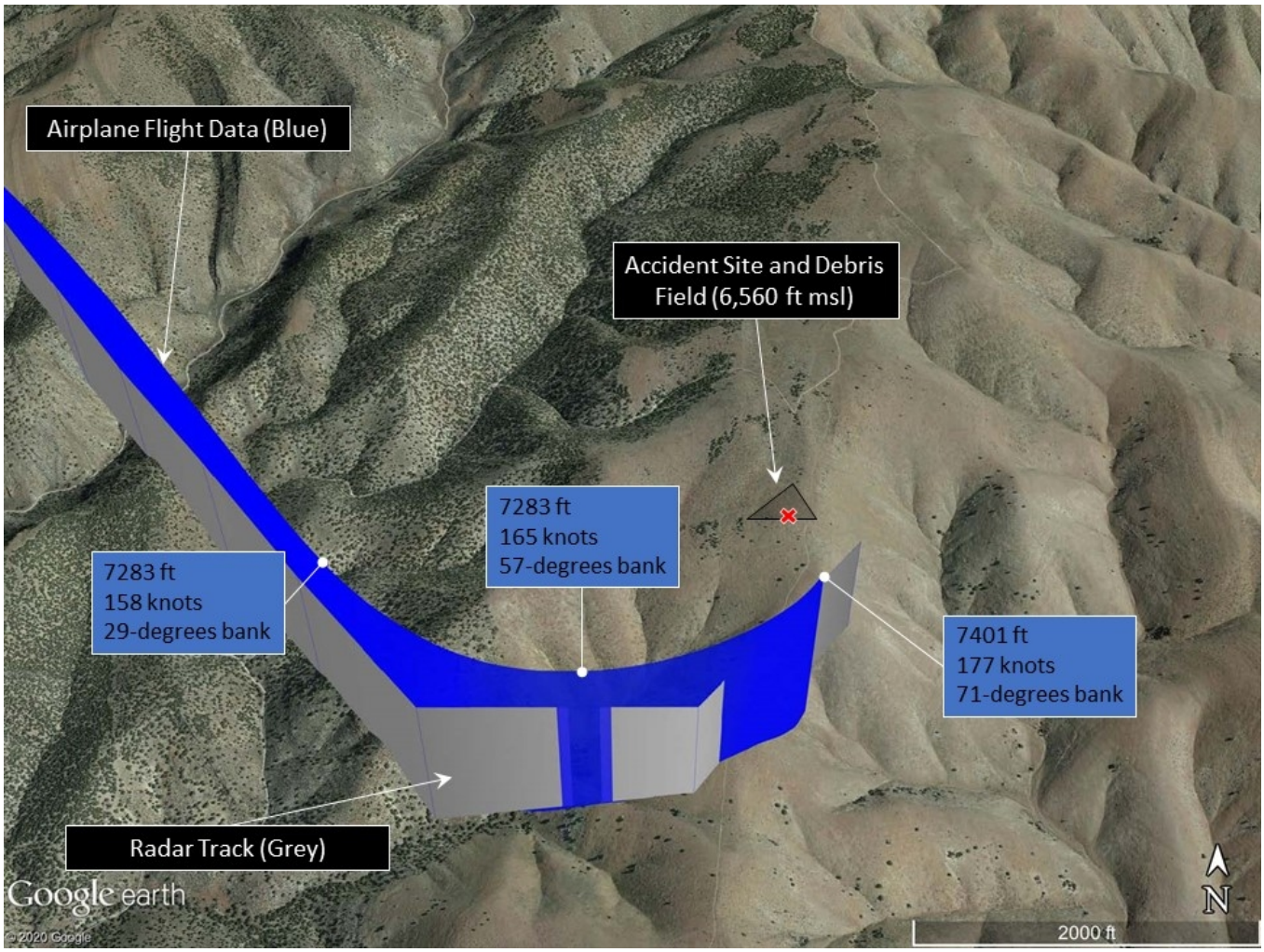

Figure 2-Radar track and airplane flight data.

After an initial search for the airplane at local airports was unsuccessful, the Federal Aviation Administration (FAA) issued an Alert Notice (ALNOT) for the airplane. The wreckage was located the following day on a south facing slope of the Lake Mountains, about 15 miles west of PVU.

PERSONNEL INFORMATION

Pilot Deviations:

FAA records revealed that the pilot had multiple investigations of airspace and communication violations from January 11, 2007 to April 30, 2018. Three airspace related events were reported during the year before the accident. Following one event, the pilot stated that he was distracted while conducting aerial mapping and following the company provided coordinates.

Medical History:

After the pilot's first FAA medical exam in 2001, the FAA denied his application due to an attention deficit disorder (ADD) diagnosis and a history of conviction. As part of an appeal, the pilot received a psychological evaluation, which revealed that the pilot's driver's license had been suspended multiple times for reckless driving and speeding and that the pilot had an impulsive personality and sought excitement; but the psychologist deferred a mental health diagnosis. During a follow-up psychiatric evaluation on March 29, 2004, the pilot's previous use of Effexor (venlafaxine) for major depression was revealed; however, the psychiatrist found no mental health, personality disorder, or medical conditions, and the FAA granted the pilot a special issuance medical certificate for ADD on September 16, 2004. After favorable follow-ups, the FAA issued him an eligibility letter on November 5, 2005.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that the airplane impacted mountainous terrain at an elevation of 6,560 ft msl, in a near-vertical nose down attitude. The debris field was about 470 ft wide and about 240 ft long and was oriented on a heading of about 350° magnetic. The main wreckage comprised of both wings, the cabin area, and empennage. The engines separated from the main wreckage and were found further up the debris field. The engines sustained substantial damage and parts from the engine were scattered throughout the debris field. (See figure 3.)

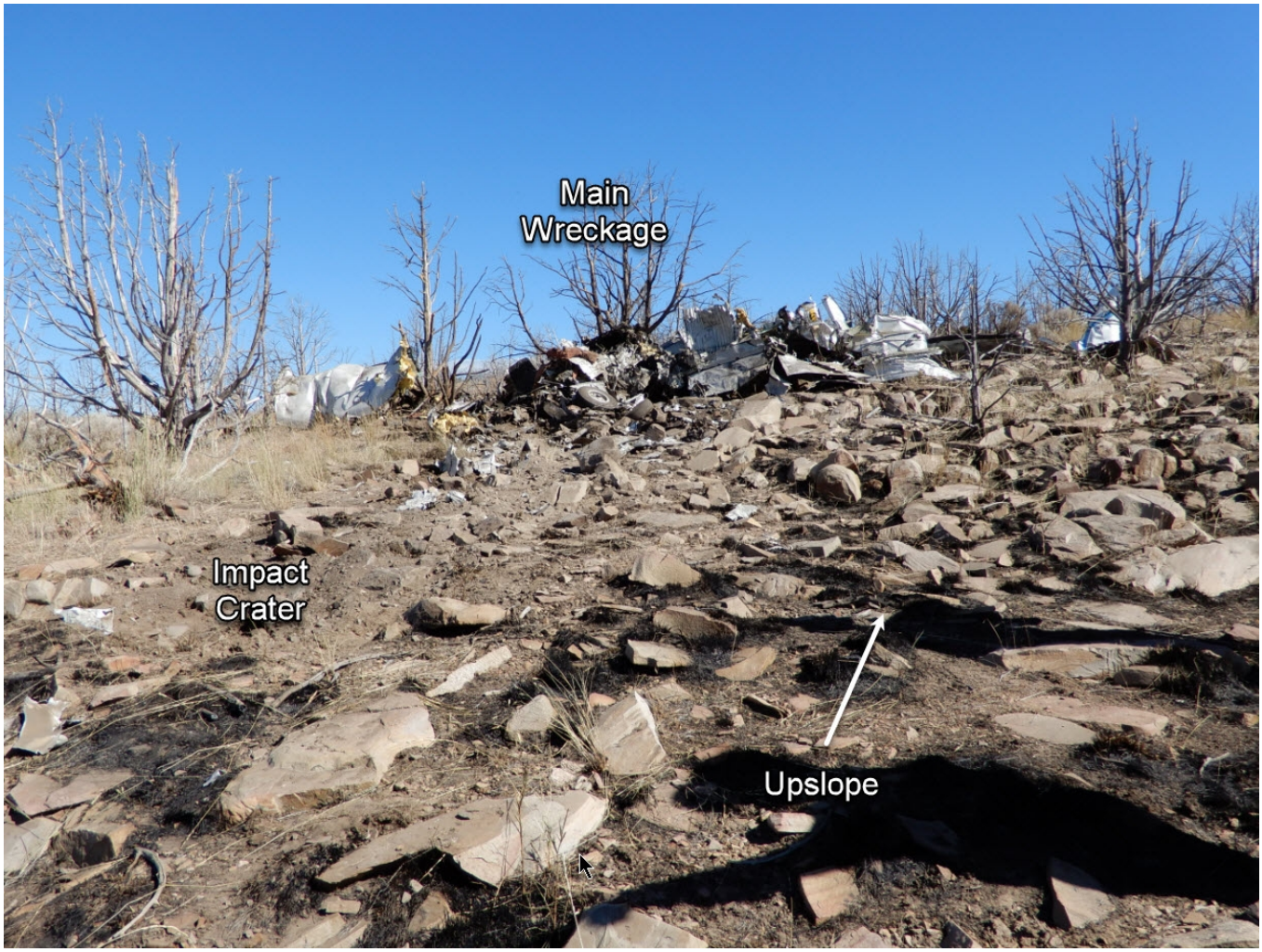

Figure 3-Accident site.

The first identified point of contact (FIPC) was a small crater measuring about 4 ft wide and about 6 inches deep. Upslope from the FIPC was an area of disturbed rock and dirt about 4 ft wide, extending about 37 ft to the main wreckage. Contained within the area of disturbed rock and dirt was another shallow crater, about 5 ft from the FIPC, that was saturated with oil and contained a separated propeller blade. Propeller blades from both engines were separated from the propeller hubs and located throughout the debris field. The propeller blades had separated tips and heavy gouging.

All primary flight control surfaces were found at the accident site. The flight control cables were connected at the control surfaces and/or their respective bellcrank. Flight control cable connections were confirmed at the cockpit flight controls.

Although the postaccident examination was limited due to impact damage, examination of the airframe and engines revealed no evidence of preaccident mechanical malfunctions or anomalies that would have precluded normal operation. The impact damage to the crankshafts prevented rotation and gear continuity to the valve train and accessory gears. Internal components were visible through the missing crankcase material.

MEDICAL AND PATHOLOGICAL INFORMATION

According to the Office of the Medical Examiner, Utah Department of Health autopsy report, the cause of death was blunt force injuries. Although the examination was limited by the extensive injuries; the remainder of the examination was unremarkable, and no significant natural disease was identified. Toxicology testing of the pilot's liver tissue performed by the Office of the Medical Examiner was positive for ethanol and beta-phenethylamine; however, these substances were likely due to postmortem production.

The FAA Forensic Sciences Laboratory did not detect any ethanol in liver tissue. Ethanol, n-butanol, and n-propanol were detected in muscle; no tested-for drugs were detected in muscle.

Information

Certificate:	**Age:**
Airplane Rating(s):	**Seat Occupied:**
Other Aircraft Rating(s):	**Restraint Used:**
Instrument Rating(s):	**Second Pilot Present:**
Instructor Rating(s):	**Toxicology Performed:**
Medical Certification:	**Last FAA Medical Exam:**
Occupational Pilot:	**Last Flight Review or Equivalent:**
Flight Time:	

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N320MF
Model/Series:	320 D	**Aircraft Category:**	Airplane
Year of Manufacture:	1965	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	320D0061
Landing Gear Type:	Tricycle	**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	5201 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Cont Motor
ELT:		**Engine Model/Series:**	TSI0-470-B
Registered Owner:		**Rated Power:**	260 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KPVU,4496 ft msl	**Distance from Accident Site:**	
Observation Time:	16:56 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.88 inches Hg	**Temperature/Dew Point:**	31°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Caldwell, ID (EUL)	**Type of Flight Plan Filed:**	
Destination:	Provo, UT (PVU)	**Type of Clearance:**	None
Departure Time:	09:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.218612,-111.929725

Administrative Information

Investigator In Charge (IIC):	Swick, Andrew		
Additional Participating Persons:	Destin Hinton; FAA-FSDO; Salt Lake City, UT Henry Soderlund; Textron Aviation; Wichita, KS Mike Council; Continental Motors Group; Mobile, AL Rick Roper; RAM Aircraft; Waco, TX Andrew Weathers; GV Air; Lehi, UT		
Original Publish Date:	December 3, 2020	**Investigation Class:**	3
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97645		