National Transportation Safety Board
Aviation Accident Final Report

Location:	Moose Pass, AK	**Accident Number:**	ANC19FA029
Date & Time:	06/28/2019, 1608 AKD	**Registration:**	N56512
Aircraft:	Maule M6	**Aircraft Damage:**	Substantial
Defining Event:	Abrupt maneuver	**Injuries:**	3 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot was conducting a personal flight with three passengers aboard. The flight encountered an area of deteriorating visibility due to smoke from a wildfire burning in the area, and the pilot was attempting to follow a highway through mountainous terrain. The pilot-rated passenger stated that, as the flight progressed, forward visibility deteriorated and was "not very good at all"; she was able to see outside the cockpit only straight down. Further, a witness near the accident site reported 1/4 miles visibility about the time of the accident. The pilot-rated passenger stated that the pilot seemed stressed due to the deteriorating conditions and that the airplane occupants discussed locating an alternate destination. The airplane then entered an unusual attitude, and one passenger began yelling, "pull-up, pull-up" to which the pilot responded, "I've got this." The pilot-rated passenger's last recollection of the flight was the airplane entering an aerodynamic stall.

GPS data from the accident flight revealed that, about 2 minutes before the accident, the airplane made about a 180° right turn and began a descent to a GPS altitude of 1,235 ft, followed by a left turn to a northerly heading and a climb to a GPS altitude of 2,032 ft and a groundspeed of 37 knots. The last recorded in-flight data point showed that the airplane was at a GPS altitude of 1,587 ft and at a 0- knot groundspeed.

The on-scene examination revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The observed damage to the airplane indicated that it impacted the ground in a nose-down, near-vertical attitude, consistent with an aerodynamic stall. Given the passenger's account and GPS data, it is likely that, due to the restricted visibility conditions, the pilot became geographically disoriented, which resulted in the airplane's flight path toward rising terrain. It is also likely that the pilot subsequently initiated a sudden climb, during which the airplane's critical angle of attack was exceeded, resulting in an aerodynamic stall and impact with terrain.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's geographic disorientation and his exceedance of the airplane's critical angle of attack while maneuvering to avoid mountainous terrain, resulting in an aerodynamic stall.

Findings

Aircraft	Airspeed - Not attained/maintained (Cause)
	Angle of attack - Capability exceeded (Cause)
Personnel issues	Geographic disorient (lost) - Pilot (Cause)
	Aircraft control - Pilot (Cause)

Factual Information

History of Flight

Enroute-cruise	Course deviation
Maneuvering-low-alt flying	Abrupt maneuver (Defining event)
	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On June 28, 2019, about 1608 Alaska daylight time, a Maule M-6-235 airplane, N56512, sustained substantial damage when it was involved in an accident about 7 miles northwest of Moose Pass, Alaska. The commercial pilot and two passengers were fatally injured, and one pilot-rated passenger was seriously injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (*CFR*) Part 91 personal flight.

The flight departed Big Johnstone Lake near Seward, Alaska, about 1529, and was destined for Lake Hood, Anchorage, Alaska. The pilot-rated passenger, who was in the right front seat, stated that she had been manipulating the airplane's flight controls but that the visibility deteriorated as the flight progressed, so the pilot assumed control of the airplane. She stated that the pilot seemed stressed due to the deteriorating conditions and that the occupants discussed locating an alternate landing spot. The pilot-rated passenger was looking out the right side of the airplane for terrain, and the pilot was looking out the left side of the airplane to try to follow Sterling Highway. She stated that forward visibility was "not very good at all" but that she was able to see straight down. She also stated that the right passenger door popped open, creating a momentary distraction, and that she was able to hold the door shut. The airplane then entered an unusual attitude, and another passenger began yelling, "pull-up, pull-up," to which the pilot responded, "I've got this." The pilot-rated passenger's last recollection of the flight was recognizing that the airplane was in a stall and hearing the stall warning horn.

The GPS data logs for the day of the accident revealed that, about 1602, the airplane crossed Moose Pass at a GPS altitude of about 2,000 ft. The airplane continued northwest along Sterling Highway at GPS altitudes that varied between 1,700 and 2,400 ft. About 1606, after passing the intersection of Sterling and Seward Highways, the airplane began a right 180° turn to the southeast; shortly thereafter, the airplane began a descent to a GPS altitude of 1,215 ft. At 1607:00, the airplane began a left turn toward a northerly heading and initiated a climb. At 1607:34, the airplane was on a track of 354° at a GPS altitude of 2,032 ft, and at a groundspeed of 37 knots. The last fully recorded in-flight data point was at 1608:01, when the airplane was at a GPS altitude of 1,587 ft and a 0-knot groundspeed and on a track of 282°. (See figure 1.)

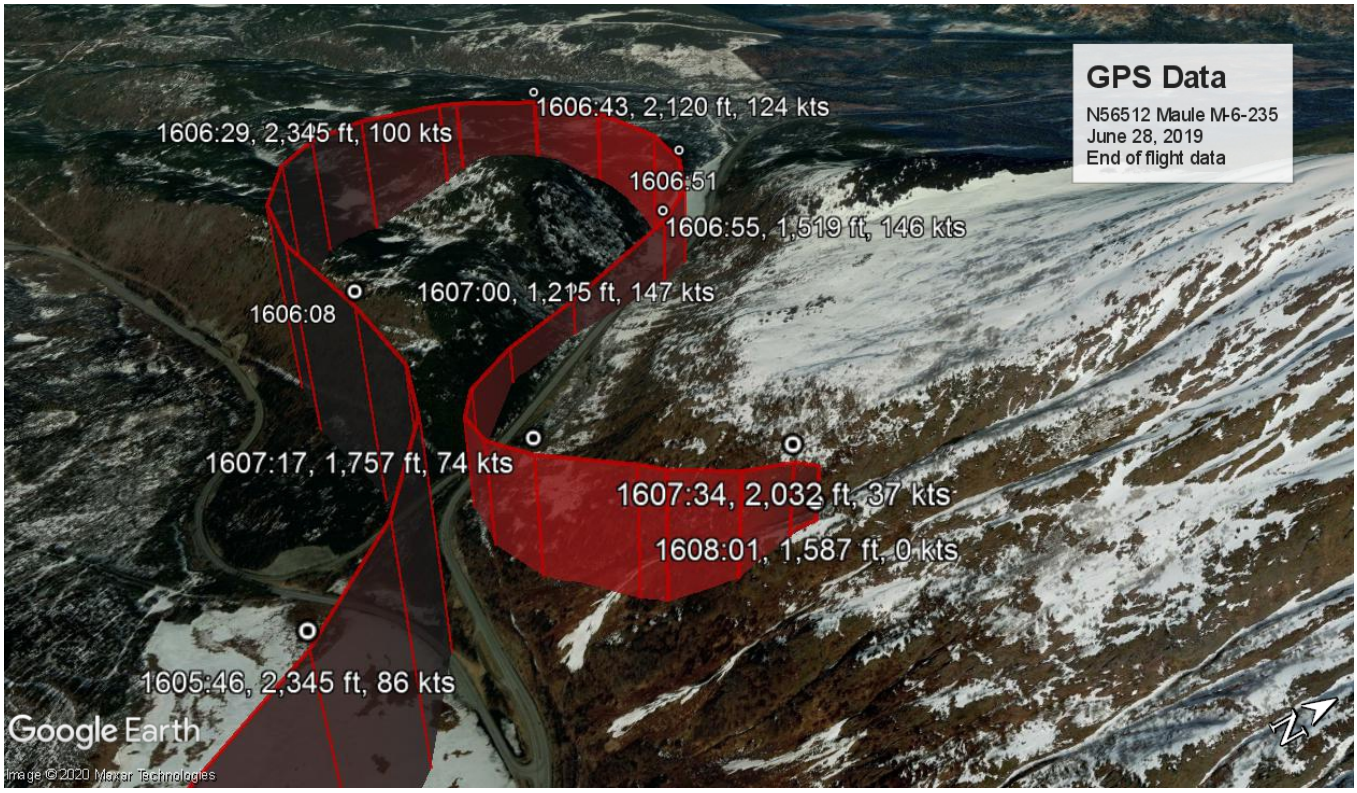

Figure 1. Last minutes of flight ground track.

A witness located near the accident site stated that he was outside shortly after 1600 on the day of the accident and heard an airplane flying overhead. He stated that the airplane sounded as if it was flying west to east and as if it was "maneuvering under power." About 15 seconds later, all airplane-related sounds ceased. He also stated that the smoke from a nearby wildfire was very thick at his location, resulting in a vertical visibility of about 100 ft and a horizontal visibility of about 1/4 mile.

According to the Alaska Rescue Coordination Center, a 406-MHz emergency locator transmitter (ELT) signal was received at 1614, and rescue personnel from the Air National Guard's 210th Air Rescue Squadron, Anchorage, began a search for the source of the ELT signal. An Air National Guard HH-60G helicopter crew discovered the accident site, and the surviving passenger was transported to a medical facility for treatment.

Pilot Information

Certificate:	Commercial	**Age:**	73, Male
Airplane Rating(s):	Single-engine Land; Single-engine Sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	Airplane Single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without Waivers/Limitations	**Last FAA Medical Exam:**	03/11/2019
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	3476 hours (Total, all aircraft)		

The pilot's personal flight records were not located.

Aircraft and Owner/Operator Information

Aircraft Make:	Maule	**Registration:**	N56512
Model/Series:	M6 235	**Aircraft Category:**	Airplane
Year of Manufacture:	1983	**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	7439C
Landing Gear Type:		**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	
Airframe Total Time:		**Engine Manufacturer:**	
ELT:		**Engine Model/Series:**	
Registered Owner:	On file	**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Unknown	**Condition of Light:**	Day
Observation Facility, Elevation:	PAWD, 22 ft msl	**Distance from Accident Site:**	30 Nautical Miles
Observation Time:	1719 AKD	**Direction from Accident Site:**	180°
Lowest Cloud Condition:		**Visibility**	7 Miles
Lowest Ceiling:	Overcast / 3700 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.7 inches Hg	**Temperature/Dew Point:**	22°C / 12°C
Precipitation and Obscuration:	Haze		
Departure Point:	Seward, AK	**Type of Flight Plan Filed:**	None
Destination:	Anchorage, AK	**Type of Clearance:**	None
Departure Time:	AKD	**Type of Airspace:**	Class G

A review of Federal Aviation Administration (FAA) weather camera images recorded from Moose Pass (52Z), about 7 miles southeast of the accident site, revealed reduced visibilities in all directions about the time of the accident as a result of smoke and/or haze in the area. Figure 2 shows the visibility in the direction of the accident site about the time of the crash; Figure 3 shows the visibility on a clear day.

Figure 2. Reduced visibility conditions in the direction of the accident location at 1610 on the day of the accident.

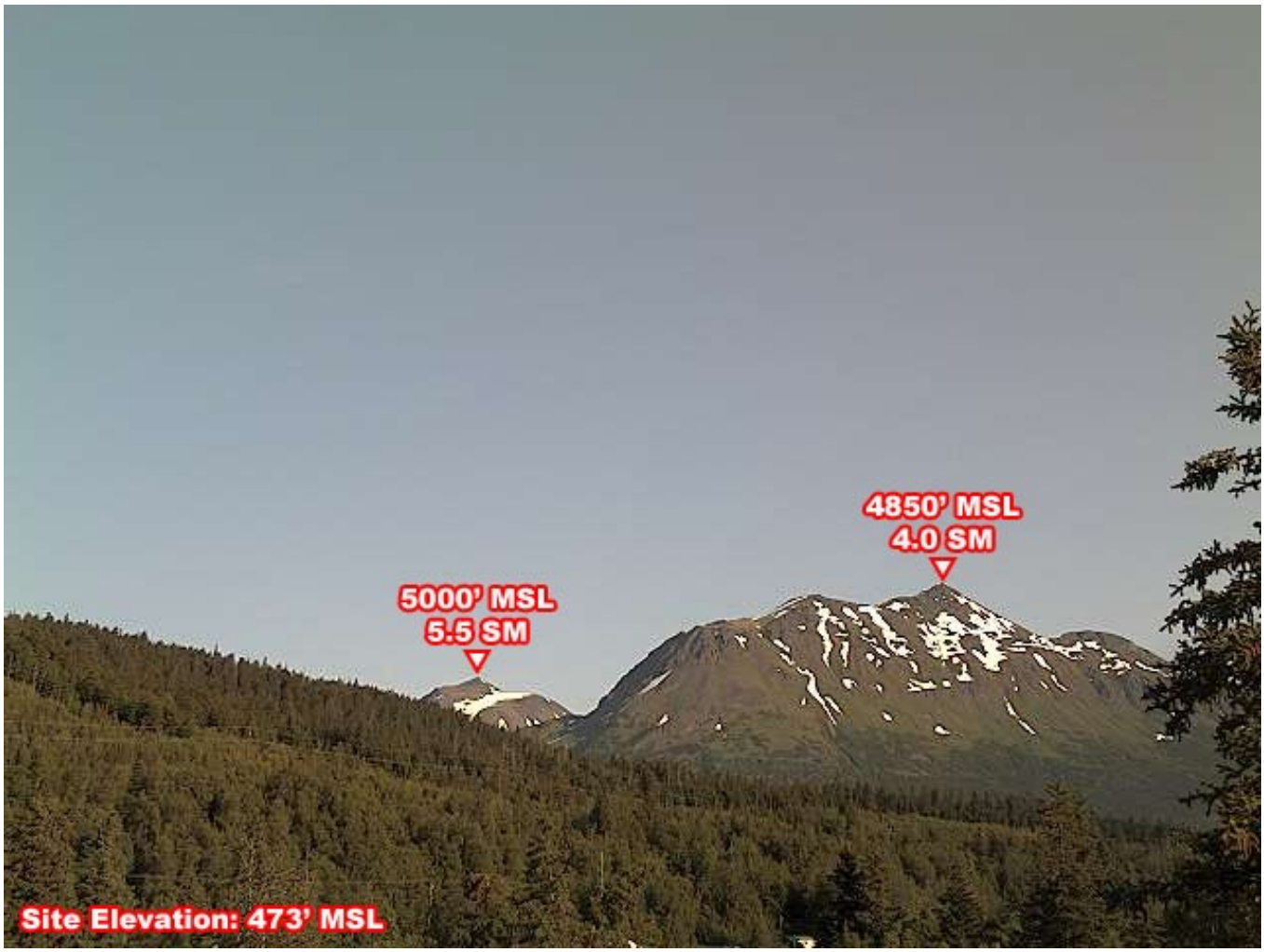

Figure 3. Visibilities in the direction of the accident location on a clear day.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Fatal, 1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal, 1 Serious	**Latitude, Longitude:**	60.539167, -149.544444 (est)

The airplane impacted an area of alder brush- and tundra-covered terrain in a near-vertical, nose-down attitude, at an elevation of about 1,546 ft mean sea level, and on a heading of about 314°.

All the airplane's major components were located at the main wreckage site. The cockpit and cabin area exhibited extensive aft crushing. The engine, firewall, and instrument panel were

displaced upward and aft. The throttle and propeller were found near the full forward position, and the mixture was found in the idle cutoff position. The fuel selector was found in the "OFF" position.

The right wing remained attached to the fuselage but exhibited leading edge crushing damage outboard near the tip. The right aileron and right wing flap remained attached to their respective attachment points and were relatively undamaged. The right auxiliary and main fuel tank caps were in place and secure. Fluid was observed in the right auxiliary fuel tank. No fluid was observed in the right main fuel tank.

The left wing remained attached to the fuselage. The left aileron and left wing flap remained attached to their respective attach points but sustained impact damage. The left auxiliary and main fuel caps were in place and secure. Fluid was observed in the left auxiliary and left main fuel tanks.

Flight control continuity was verified from the cockpit in the direct cables and balance cable to the left and right ailerons.

The left and right horizontal stabilizers, elevators, vertical stabilizer and rudder, and the left elevator and rudder trim tab remained attached to their respective attachment points and were relatively undamaged.

The engine remained attached to the airframe. The propeller remained attached to the crankshaft flange, the blades remained attached to the propeller hub assembly, and the crankshaft separated about 1 inch behind the flange. Both blades exhibited substantial leading edge gouging and torsional "S" twisting.

The pilot-rated passenger reported no mechanical malfunctions with the airplane or its systems, and the on-scene examination revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Medical And Pathological Information

The State of Alaska Medical Examiner's Office, Anchorage, Alaska, performed an autopsy of the pilot. His cause of death was multiple blunt impact injuries.

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified ethanol in the pilot's cavity blood specimens (0.017 gm/dL) and urine specimens (0.021 gm/dL). N-Butanol was also identified in the pilot's cavity blood and urine specimens, and N-propanol was found in the pilot's urine specimens. No carbon monoxide or tested-for drugs were found in the pilot's specimens.

Ethanol is the intoxicant commonly found in beer, wine, and liquor. It acts as a central nervous system depressant. Ethanol can also be formed in tissues after death as a byproduct of microbial action. N-Butanol and N-propanol are common byproducts of postmortem microbial action. Based on the levels found, the ethanol was likely produced postmortem.

Administrative Information

Investigator In Charge (IIC):	David B Banning	**Report Date:**	08/11/2020
Additional Participating Persons:			
Publish Date:	08/11/2020		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=99728		