Aviation Investigation Final Report

Location:	Nome, Alaska	**Accident Number:**	ANC19TA017
Date & Time:	April 15, 2019, 09:00 Local	**Registration:**	N5163E
Aircraft:	Cessna A185	**Aircraft Damage:**	Substantial
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	1 Serious
Flight Conducted Under:	Public aircraft		

Analysis

The pilot was conducting a visual flight rules (VFR) cross-country flight in marginal VFR conditions. While en route to his destination, he decided to maneuver off the intended course to surveil a mountainous area in the national park. While maneuvering in that area, he observed deteriorating weather. While he was looking down at the GPS display to confirm that he was navigating properly, the airplane entered instrument meteorological conditions (IMC). The pilot stated that he looked up and "probably" experienced spatial disorientation, so he commenced an instrument scan, confirmed that the wings were level, and started a right 180° turn to return to visual conditions. A review of GPS data indicated that the airplane was established on a relatively steady course about 600 ft above ground level, heading directly into higher terrain, then turned right for 50° and descended at a rate of about 520 ft per minute into terrain. The wreckage came to rest on the slope of a snow-covered ridge and was separated into sections along a 120-ft path, with signatures indicative of high-speed impact in a slight left-wing-low attitude. The fuselage, wings, and empennage sustained substantial damage.

The weather forecast for the area indicated marginal VFR conditions, which was within the agency's weather minimums. The pilot reported that while maneuvering to the ridgeline area, he noted "low" and "thick" clouds but felt comfortable because he was flying along the ridgeline that he recognized.

A review of the pilot's training records indicated that he was certified by his agency's department for VFR-only flights and had no recent instrument flight experience. The agency had no instrument training or currency for reciprocating airplane pilots who were assigned to VFR flights. The pilot stated that he did receive simulated instrument training and was taught to turn back 180° for unintentional flight into IMC, although instrument training and inadvertent IMC were not documented on the annual check flight.

Despite the forecast indicating marginal VFR conditions for the area, while en route, the pilot chose to divert from his planned route into an area of low cloud ceilings and rising terrain. The pilot inadvertently flew into the clouds, and by his own admission and the GPS data indicating an erratic flight profile, he likely experienced spatial disorientation, which resulted in the airplane's descent into and impact with terrain. Contributing to the accident was the pilot's lack of instrument proficiency which limited the skill required to perform the recovery technique while referencing only the instruments.

Probable Cause and Findings

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

The pilot's decision to continue a visual flight rules flight into an area of mountainous terrain and instrument meteorological conditions, which resulted in spatial disorientation and controlled flight into terrain. Contributing to the accident was the pilot's lack of instrument proficiency.

Findings

Personnel issues	Decision making/judgment - Pilot
Environmental issues	Low visibility - Response/compensation
Environmental issues	Mountainous/hilly terrain - Response/compensation
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Recent instruct/training recvd - Pilot

Factual Information

History of Flight

Enroute-cruise	VFR encounter with IMC
Enroute-cruise	Controlled flight into terr/obj (CFIT) (Defining event)

On April 15, 2019, about 0900 Alaska daylight time, a Cessna A185F airplane, N5163E, sustained substantial damage when it was involved in an accident near Nome, Alaska. The pilot sustained serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 public aircraft flight.

The pilot stated that the purpose of the flight was to fly from Ralph Wien Memorial Airport (PAOT), Kotzebue, Alaska, to Nome Airport (PAOM), Nome, Alaska (about 160 nautical miles), to pick up two National Park Service employees for transport. The pilot reported that he had flown the route from POAT to PAOM many times and was very familiar with the terrain along the route. He recalled that the graphical weather forecast for the area was for marginal visual flight rules (VFR) conditions; the weather forecast for PAOM was better than 1,900 ft ceiling and 10 statute miles of visibility. The pilot completed an operational risk assessment, filed a flight plan with the National Park Service Denali Dispatch, and departed PAOT about 0814.

While en route, the pilot decided to fly over and surveil the Serpentine Hot Springs area, which was west of his planned flight route. He stated that he was flying about 1,600 ft mean sea level (msl), heading to the southwest, with a ridgeline close on the right side of the airplane. He observed a 500-ft warning from the terrain awareness and warning system on the Garmin GTN 750 GPS for the ridgeline on the right and noted also deteriorating weather conditions to the north. He observed “low” and “thick” cloud ceilings but felt comfortable because he was flying along a ridgeline that he recognized. He momentarily looked down at the GPS unit to check his navigation to the CIVID waypoint, and when he looked up, the airplane had entered instrument meteorological conditions (IMC). He stated that he felt disoriented and “probably” experienced spatial disorientation, so he immediately began an instrument scan and verified that the wings were level. In an attempt to return to visual meteorological conditions, he initiated a right 180° turn, momentarily forgetting that terrain was to the right, and the airplane immediately impacted snow-covered terrain. During the impact sequence, the left wing separated from the fuselage. The pilot recalled that he woke up inverted, secure in the seat restraint harness. He egressed the wreckage and observed heavy snowfall and wind. He sheltered inside the airplane until he was rescued about 1800 that day.

A review of GPS data extracted from a Garmin GPSMAP 296 unit revealed that about 0858:37 (1 1/2 minutes before the accident), the airplane was flying at 1,358 ft msl (about 660 ft above ground level) along the south side of a river valley tracking about 250° +/- 7°, heading upriver in the direction of gently rising terrain. The airplane climbed to 1,424 ft msl, descended to 1,385 ft, climbed to 1,511 ft, descended to 1,409 ft, then climbed to 1,659 ft and turned right to 303° while climbing to 1,691 ft. The

airplane then descended about 520 ft per minute into rising terrain and impacted a mountain slope about 1,552 ft msl at 0900:07. See figure 1.

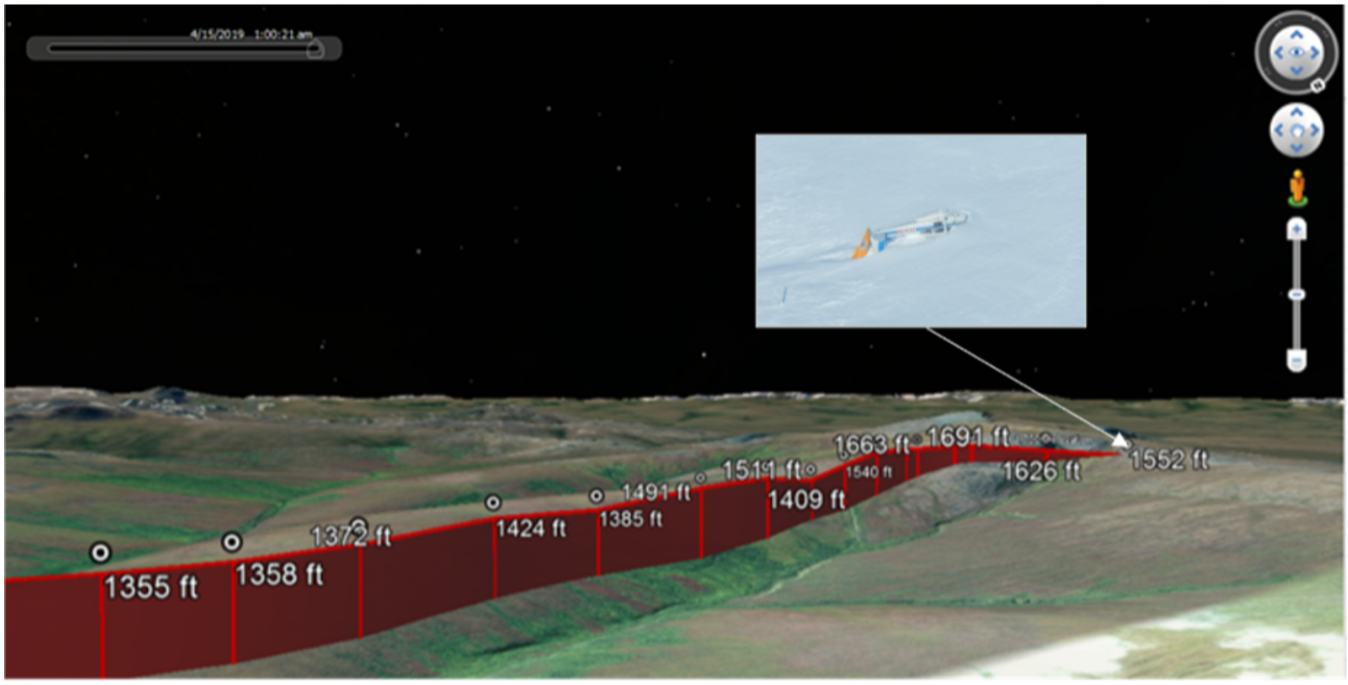

Figure 1. GPS track in 3D depiction on a Google Earth image with photograph of wreckage. (Source: Department of Interior Office of Aviation Services)

The GPS data also revealed that the airplane was flying on a course into, and at an altitude below, an 1,800 ft ridge that was about 2,000 ft directly in front of the airplane before it turned right. The mountain was clearly marked on the VFR sectional chart. See figure 2.

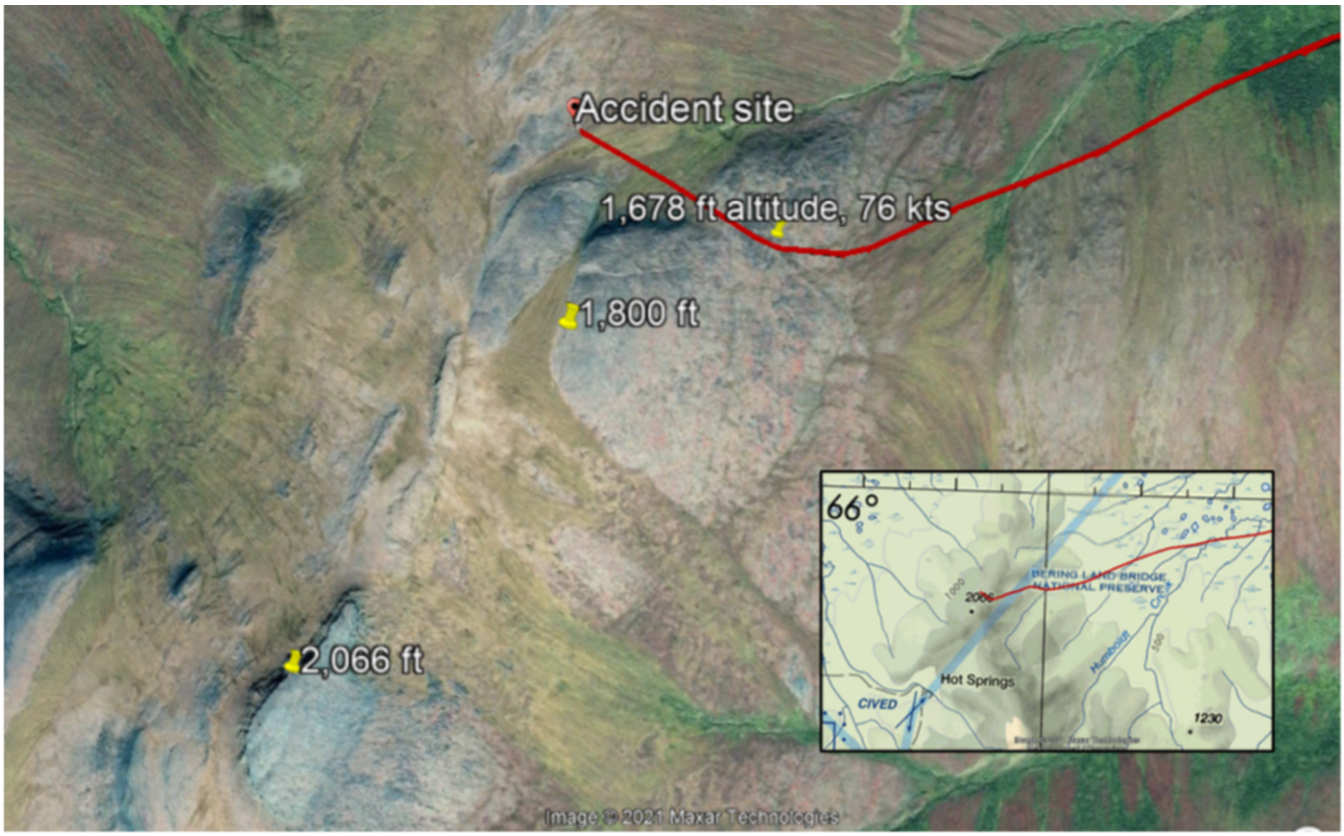

Figure 2. The GPS end of flight track with mountain elevations depicted and VFR sectional insert.

The wreckage came to rest on the slope of a snow-covered ridge and was separated into sections along a 120-ft debris path to the northwest consistent with a high speed impact in forward flight. The propeller and left main landing gear were first in the path, followed by the separated left wing and then the inverted fuselage with the right wing and empennage attached. The fuselage, wings, and empennage sustained substantial damage.

The Alaska Aviation Weather Unit issued a graphical flying weather forecast at 0400, current for the entire route of the flight, that indicated marginal VFR conditions.

The pilot was certified by the Department of Interior's Office of Aviation Services Alaska Region as a VFR-only pilot. He was instrument rated; however, he was not instrument current, nor was he required to be under Department of Interior guidance. The pilot stated that he obtained some IMC recovery training during annual flight training. He was taught to transition to an instrument scan, perform a course reversal for 180°, and "fly back out of it.".

Spatial Disorientation

The Federal Aviation Administration Civil Aerospace Medical Institute's publication, "Introduction to Aviation Physiology," defines spatial disorientation as a "loss of proper bearings; state of mental confusion as to position, location, or movement relative to the position of the earth." This document lists factors contributing to spatial disorientation, including changes in angular acceleration, flight in IFR [instrument flight rules] conditions, frequent transfer from VFR to IFR conditions, and unperceived

changes in aircraft attitude. This document concludes, "anytime there is low or no visual cue coming from outside of the aircraft, you are a candidate for spatial disorientation."

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	60,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 16, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 1, 2018
Flight Time:	6400 hours (Total, all aircraft), 200 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N5163E
Model/Series:	A185 F	**Aircraft Category:**	Airplane
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18503293
Landing Gear Type:	Tailwheel; Ski/wheel	**Seats:**	4
Date/Type of Last Inspection:	September 19, 2018 Annual	**Certified Max Gross Wt.:**	3350 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	7360 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	IO-520D
Registered Owner:		**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PADE,21 ft msl	**Distance from Accident Site:**	46 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	78°
Lowest Cloud Condition:		**Visibility**	9 miles
Lowest Ceiling:	Overcast / 1700 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.79 inches Hg	**Temperature/Dew Point:**	-9°C / -12°C
Precipitation and Obscuration:	Light - None - Snow		
Departure Point:	Kotzebue, AK (OTZ)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Nome, AK (OME)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	65.925834,-164.61138(est)

Administrative Information

Investigator In Charge (IIC):	Price, Noreen		
Additional Participating Persons:	John Mills; DOI Office of Aviation Safety; Boise, ID		
Original Publish Date:	July 15, 2021	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99267		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.