National Transportation Safety Board
Aviation Accident Final Report

Location:	Anaktuvuk Pass, AK	**Accident Number:**	ANC16LA012
Date & Time:	01/02/2016, 1205 AKS	**Registration:**	N540ME
Aircraft:	CESSNA 208B	**Aircraft Damage:**	Substantial
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	5 Serious, 3 Minor
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Scheduled		

Analysis

The airline transport pilot was conducting a scheduled passenger flight in an area of remote, snow-covered, mountainous terrain with seven passengers on board. The pilot reported that, after receiving a weather briefing, he chose to conduct the flight under visual flight rules (VFR). While en route about 10,000 ft mean sea level (msl), the visibility began "getting fuzzy." The pilot then descended the airplane to 2,500 ft msl (500 ft above ground level) to fly along a river. When the airplane was about 10 miles southwest of the airport, he climbed the airplane to about 3,000 ft msl in order to conduct a straight-in approach to the runway. He added that the visibility was again a little "fuzzy" due to snow and clouds, and that he never saw the airport. The pilot also noted that the flat light conditions limited his ability to determine his distance from the surrounding mountainous, snow-covered terrain. Shortly after climbing to 3,000 ft msl, the airplane collided with the rising terrain about 6 miles southwest of the airport. Another pilot, who had just departed from the airport, confirmed that flat light and low-visibility conditions existed in the area at the time of the accident. Further, camera images of the weather conditions recorded at the airport showed that, although conditions were marginal VFR at the surface at the time of the accident, there was mountain obscuration and reduced visibility due to light snow and clouds along the accident flight path and that the worst conditions were located along and near the higher terrain.

The pilot reported no preimpact mechanical malfunctions or failures with the airplane that would have precluded normal operation. It is likely that that the pilot encountered flat light and low-visibility conditions as he neared the airport at 3,000 ft msl while operating under VFR and that he did not see the rising, snow-covered mountainous terrain and subsequently failed to maintain clearance from it.

Probable Cause and Findings

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

The pilot's continued flight into deteriorating, flat light weather conditions, which resulted in impact with mountainous, snow-covered terrain.

Findings

Aircraft	Heading/course - Not attained/maintained (Cause)
Personnel issues	Decision making/judgment - Pilot (Cause)
Environmental issues	Flat light - Effect on personnel (Cause) Flat light - Decision related to condition (Cause)

Factual Information

History of Flight

Enroute	Controlled flight into terr/obj (CFIT) (Defining event)

On January 2, 2016, about 1205 Alaska standard time, a single-engine, turbine-powered Cessna 208B airplane, N540ME, impacted mountainous, snow-covered terrain about 6 miles southwest of Anaktuvuk Pass Airport, Anaktuvuk Pass, Alaska. The airline transport pilot and four passengers sustained serious injuries, and three passengers sustained minor injuries. The airplane sustained substantial damage. The airplane was being operated by Wright Air Service, Inc., Fairbanks, Alaska, as a 14 *Code of Federal Regulations* Part 135 visual flight rules (VFR) scheduled commuter flight. Visual meteorological conditions (VMC) existed at the Anaktuvuk Pass Airport at the time of the accident, and company flight-following procedures were in effect. The flight departed from Fairbanks International Airport, Fairbanks, Alaska, about 1030 destined for Anaktuvuk Pass. The area between Fairbanks and Anaktuvuk Pass consists of remote, steep mountainous terrain, which is snow-covered in January.

Following the accident, the pilot stated that, after receiving a weather briefing in the morning from the Federal Aviation Administration (FAA) Flight Service Center, he chose to conduct the flight under VFR. He reported that, while en route to Anaktuvuk Pass about 10,000 ft mean sea level (msl), the visibility began "getting fuzzy" as he flew over the Caribou Hills. He then descended to 2,500 ft msl (or 500 ft above ground level) to fly along the John River. When the airplane was about 10 miles southwest of Anaktuvuk Pass, he climbed to about 3,000 ft msl to be at the published airport traffic pattern altitude while maintaining a flight track on the east side of the river valley to conduct a straight-in approach to runway 2. He added that the visibility was again a little "fuzzy"; that there was snow, white walls, and white clouds; and that he never saw the airport. The pilot noted that the flat light conditions limited his ability to determine his distance from the surrounding snow-covered, mountainous terrain. Shortly after climbing to 3,000 ft msl, the airplane collided with the rising snow-covered terrain about 6 miles southwest of the Anaktuvuk Pass Airport. The pilot stated that he did not remember any ground proximity warning system alerts before the collision. In a subsequent written statement, the pilot reported no preimpact mechanical failures or malfunctions with the airframe or engine that would have precluded normal operation.

The airplane's Spidertracks flight tracking system transmitted flight tracking data every 2 minutes. A review of the data revealed that the airplane's last reported location was along the east side of the John River valley at an altitude of 2,560 ft msl on a ground track of about 48°.

Immediately following the accident, a passenger used a cell phone to call for rescue from Anaktuvuk Pass residents. About 20 minutes later, rescue personnel located the airplane and began extricating passengers from the wreckage and transporting them via snow machine to Anaktuvuk Pass for medical attention.

Pilot Information

Certificate:	Airline Transport; Commercial	**Age:**	57, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	5-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With Waivers/Limitations	**Last FAA Medical Exam:**	10/01/2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	11/21/2015
Flight Time:	(Estimated) 8854 hours (Total, all aircraft), 4142 hours (Total, this make and model), 7520 hours (Pilot In Command, all aircraft), 287 hours (Last 90 days, all aircraft), 99 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

The pilot, age 57, held an airline transport pilot certificate with airplane single-engine land and multiengine land ratings. The pilot was issued a first-class airman medical certificate on October 1, 2015 with the limitation that he must have available glasses for near vision.

The accident pilot completed CFIT avoidance training on May 26, 2015. On November 21, 2015 the pilot successfully completed an airman competency and proficiency check in accordance with 14 CFR 135.293 and 135.297 which included CFIT avoidance.

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	**Registration:**	N540ME
Model/Series:	208B	**Aircraft Category:**	Airplane
Year of Manufacture:	1996	**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	208B-0540
Landing Gear Type:	Tricycle	**Seats:**	10
Date/Type of Last Inspection:	12/09/2015, AAIP	**Certified Max Gross Wt.:**	7449 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo Prop
Airframe Total Time:	19555.4 Hours as of last inspection	**Engine Manufacturer:**	P&W CANADA
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	PT6A-6 SERIES
Registered Owner:	WRIGHT AIR SERVICE INC	**Rated Power:**	675 hp
Operator:	WRIGHT AIR SERVICE INC	**Operating Certificate(s) Held:**	Commuter Air Carrier (135); On-demand Air Taxi (135)
Operator Does Business As:		**Operator Designator Code:**	HYTA

The accident airplane, a Cessna 208B, N540ME, was manufactured in 1996. At the time of the last inspection on December 9, 2015, the airplane had logged a total time in service of 19,555.4 flight hours.

The airplane was equipped with a Pratt & Whitney Canada PT6A-114A, 675 shaft horse power turbine engine. The engine had a total time in service of 8,915.4 hours, of which 3,542.4 hours were since the last overhaul.

The airplane was equipped with a Terrain Awareness Warning System (TAWS). The pilot did not recall inhibiting the system, which required navigation through several data pages within the GPS unit. The airplane was not equipped with a remote inhibit switch and due to system design and a lack of non-volatile memory, the status of the system could not be determined post-accident.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	PAKP, 2100 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	2136 UTC	**Direction from Accident Site:**	28°
Lowest Cloud Condition:	Scattered / 3400 ft agl	**Visibility**	6 Miles
Lowest Ceiling:	Broken / 4300 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/ Unknown
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/ Light
Altimeter Setting:	29.03 inches Hg	**Temperature/Dew Point:**	-7°C / -11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	FAIRBANKS, AK (FAI)	**Type of Flight Plan Filed:**	VFR
Destination:	ANAKTUVUK PASS, AK (AKP)	**Type of Clearance:**	Traffic Advisory; VFR
Departure Time:	1030 AKS	**Type of Airspace:**	Class G

The closest weather reporting facility was Anaktuvuk Pass Airport, located about 6 miles northeast of the accident site. At 1156, a METAR was reporting, in part, wind from 170° at 5 knots; sky condition, broken clouds at 4,400 ft, overcast at 5,000 ft; visibility 6 statute miles; temperature 19°F, dew point 12°F; and altimeter setting 29.03 inches of mercury.

The FAA maintained weather cameras at Anaktuvuk Pass, which recorded images to the northeast, southeast, south, and southwest; the site elevation was 2,171 ft msl. A review of the recorded images revealed deteriorating weather conditions about the time of the accident. The south-facing camera showed that, between 1152 and 1212, the visibility was less than 2 miles, that ceiling conditions were below 4,100 ft msl, and that snow was falling. Weather conditions improved slightly by 1222 with visibility greater than 2 miles but less than 4 miles and a broken cloud ceiling. Overall, the camera images showed that, although conditions were marginal VFR at the surface at the time of the accident, there was mountain obscuration and reduced visibility due to light snow and clouds along the accident flightpath and that the worst conditions existed along and near the higher terrain at the time of the accident. The pilot reported that he did not check the FAA weather cameras before departure because it was dark at Anaktuvuk Pass at the time of departure.

Another pilot who had just departed from Anaktuvuk Pass reported that he contacted the accident pilot as he was approaching the airport and stated that the weather was "pretty much as advertised." The other pilot added that he had encountered flat light conditions after departing Anaktuvuk Pass, which was "compounded by low visibility," and that, to remain in VMC, he had to turn toward the north side of the valley and initiate a climb. The pilot stated that he perceived that the flat light and low-visibility conditions were highly localized.

Airport Information

Airport:	ANAKTUVUK PASS (AKP)	**Runway Surface Type:**	Gravel
Airport Elevation:	2106 ft	**Runway Surface Condition:**	Ice; Snow
Runway Used:	02	**IFR Approach:**	None
Runway Length/Width:	4800 ft / 100 ft	**VFR Approach/Landing:**	Full Stop; Valley/Terrain Following; Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	4 Serious, 3 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Serious, 3 Minor	**Latitude, Longitude:**	68.078333, -151.896389 (est)

On January 3, two FAA aviation safety inspectors traveled to Anaktuvuk Pass and reached the accident site that morning. The inspectors reported that the main wreckage was in an open area of snow-covered tundra at an elevation of about 2,500 ft msl. The top of the ridge where the airplane impacted was at an elevation of about 3,000 ft msl. From the initial point of impact, the airplane slid downhill about 300 ft and then came to rest in an upright position. The FAA inspectors reported finding a 1/2-inch layer of ice on the nonprotected, leading edge surfaces of the tail structure and outside air temperature probe. However, no ice was present on the areas protected by the inflatable deice boots.

The airplane wreckage was further examined by the NTSB IIC, two Textron Aviation air safety investigators, and a representative from the operator. The examination revealed that the airplane had sustained substantial damage to the fuselage, wings, and empennage. Flight control primary and secondary cable continuities were established from the cockpit controls to the respective flight control bell cranks and trim surface actuators. The flight control surfaces remained attached to the airplane except for the left aileron, which was separated outboard of the inboard hinge. The left aileron control rod was separated. The separated left aileron was observed during the initial on-scene examination, but due to recent snowfall, the remaining portion of aileron was not recovered with the airplane wreckage. The pitch trim actuator extensions were altered at the accident site to facilitate recovery. The aileron trim actuator was found in the "neutral" position. The flap actuator screw jack extension indicated that the flaps were retracted. The engine had separated from the firewall at the attachment points. Rotational scarring at the propeller hub attachment points were consistent with the engine operating at the time of impact.

The examination revealed no preimpact mechanical malfunctions or anomalies with the airplane or engine that would have precluded normal operation.

Flight Recorders

The accident airplane was not equipped, nor was it required to be equipped with, a cockpit voice recorder or a flight data recorder.

Medical And Pathological Information

The FAA's Civil Aerospace Medical Institute performed toxicological testing on specimens from the pilot on February 12, 2016 which was negative for ethanol and drugs.

ADDITIONAL INFORMATION

Medallion Foundation

According to the Medallion Foundation Shield Program website, the purpose of the Shield Program was to create and maintain a higher level of safety through the use of system safety and safety management system principles. An applicant needed to earn a "star" in each of the following categories to earn a shield:

- Controlled flight into terrain (CFIT) avoidance
- Operational control
- Maintenance and ground service
- Safety
- Internal evaluation

  To earn a star, an applicant organization had to complete specific training classes, produce a required manual, and undergo an external audit to determine if the company had incorporated the information into its corporate culture. Following the initial audit, annual independent audits were to be conducted.

  According to the Medallion website, the benefits of being a Shield carrier "include reduced insurance rates, cross promotional marketing of Shield carriers and recognition by DOD [Department of Defense], OGP [Oil and Gas Producers] and the FAA as an operator who incorporates higher standards of safety than required by regulations."

At the time of the accident, Wright Air Service was the holder of a CFIT avoidance "star."

Flat Light Conditions

In the FAA publication titled, "Flying in Flat Light and White Out Conditions," flat light is defined as an optical illusion that causes pilots to lose their depth perception and contrast in vision. It states that flat light can completely obscure features of the terrain, creating an inability to distinguish distances and closure rates.

Administrative Information

Investigator In Charge (IIC):	David S Williams	**Report Date:**	08/28/2017
Additional Participating Persons:	Clark Miller; FAA; Fairbanks, AK		
Publish Date:	08/28/2017		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=92514		