Aviation Investigation Final Report

Location:	Talkeetna, Alaska	**Accident Number:**	ANC18FA063
Date & Time:	August 4, 2018, 17:53 Local	**Registration:**	N323KT
Aircraft:	De Havilland DHC-2	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	5 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Sightseeing		

Analysis

The commercial pilot was conducting a 1-hour commercial air tour flight over Denali National Park and Preserve with four passengers on board. About 48 minutes after departure, the Alaska Rescue Coordination Center received an alert from the airplane's emergency locator transmitter. About 7 minutes later, company personnel received a call from the pilot, who reported that the airplane had run "into the side of a mountain." Although a search was initiated almost immediately, due to poor weather conditions in the area, the wreckage was not located until almost 36 hours later in a crevasse on a glacier about 10,920 ft mean sea level. Due to the unique challenges posed by the steepness of terrain, the crevasse, avalanche hazard, and the condition of the airplane, neither the occupants nor the wreckage were recovered from the accident site.

A weather model sounding for the area of the accident site estimated broken cloud bases at 700 ft above ground level (agl) with overcast clouds at 1,000 ft agl and cloud tops to 21,000 ft agl and higher clouds above. The freezing level was at 9,866 ft and supported light-to-moderate rime type icing in clouds and precipitation. The on-scene assessment indicated that the right wing impacted snow while the airplane was flying in a wings-level attitude; the right wing had separated from the remainder of the wreckage. Based upon available weather data and forecast models and the impact evidence, it is likely that the pilot entered an area of reduced visibility and was unable to see the terrain before the airplane's right wing impacted the snow.

The company's organizational structure was such that one group of management personnel oversaw operations in both Anchorage and Talkeetna. Interviews with company management revealed that they were not always aware of the exact routing a pilot would take for a tour; the route was pilot's discretion based upon the weather at the time of the flight to provide the best tour experience.

Regarding risk mitigation, the company did not utilize a formal risk assessment process, but rather relied on conversations between pilots and flight followers. This could lead to an oversight of actual risk associated with a particular flight route and weather conditions.

About 8 months after the accident, an assessment flight conducted by the National Park Service determined that during the winter, the hazardous hanging glacier at the accident site calved, releasing an estimated 4,000 to 6,000 tons of ice and debris. There was no evidence of the airplane wreckage near the crash site, in the steep fall line, or on the glacier surface over 3,600 ft below.

Although the known circumstances of the accident are consistent with a controlled flight into terrain event, the factual information available was limited because the wreckage was not recovered and no autopsy or toxicology of the pilot could be performed; therefore, whether other circumstances may have contributed to the accident could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Impact with terrain for reasons that could not be determined because the airplane was not recovered due to the inaccessible nature of the accident site.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Enroute	Unknown or undetermined (Defining event)

On August 4, 2018, about 1753 Alaska daylight time, a de Havilland DHC-2 airplane, N323KT, sustained substantial damage during an impact with steep, snow-covered terrain about 50 miles northwest of Talkeetna, Alaska, in Denali National Park and Preserve. The commercial pilot and four passengers were fatally injured. The airplane was registered to Rust Properties, LLC, and was operated by Rust's Flying Service, Inc., doing business as K2 Aviation, as a Title 14 *Code of Federal Regulations* (*CFR*) Part 135 visual flight rules on-demand commercial air tour flight. Visual meteorological conditions prevailed and company flight following procedures were in effect. The flight departed Talkeetna Airport at 1705 and was scheduled to return about 1 hour later.

The glacier tour flight comprised an aerial tour of multiple glaciers as well as the area that serves as base camp for Denali climbers. A review of GPS track data from the company's satellite tracking program revealed that, at 1746, the accident airplane had changed its course near the Denali summit and proceeded southeast down the Kahiltna glacier valley abeam the Kahiltna Climber Base Camp.

At 1753, the Alaska Rescue Coordination Center received an alert from the airplane's emergency locator transmitter (ELT). At 1756, K2 Aviation's satellite tracking program alerted the flight follower that satellite tracking had stopped and the company initiated lost aircraft procedures. About 1800, the accident pilot placed a satellite phone call to personnel at K2 Aviation. According to another company pilot that was in the operations area at K2 Aviation, the accident pilot stated on that call "[w]e've run into the side of a mountain" and that they were in need of rescue; the connection was lost shortly thereafter. After several attempts, contact was again made with the accident pilot, who stated that he was trapped in the wreckage and there were possibly two fatalities. No further information was received before the connection was lost a second time. At 2008, a National Park Service (NPS) rescue helicopter departed Talkeetna Airport en route to the coordinates transmitted from the ELT. Due to poor weather conditions in the area, the wreckage was not located. On August 6, an NPS helicopter crew located the airplane in a crevasse on a hanging glacier on Thunder Mountain (about 14 miles southwest of the Denali summit) at an elevation about 10,920 ft mean sea level (msl).

Pilot Information

Certificate:	Commercial	**Age:**	58,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 13, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 18, 2018
Flight Time:	(Estimated) 2550 hours (Total, all aircraft), 346.7 hours (Total, this make and model), 216 hours (Last 90 days, all aircraft), 78.8 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

The pilot, age 58, held a commercial pilot certificate with ratings for airplane single-engine land and sea and instrument airplane. His most recent second-class Federal Aviation Administration medical certificate was issued on March 13, 2018, with a limitation for corrective lenses.

The pilot's personal logbooks were located; however, the last entry in the logbook was April 27, 2018. Company records indicated that the pilot had accumulated about 2,550 total hours of flight experience, of which about 216 were in the previous 90 days and 78.8 were in the previous 30 days. His most recent pilot competency check conducted in accordance with 14 *CFR* 135.293 was completed on May 18, 2018.

Aircraft and Owner/Operator Information

Aircraft Make:	De Havilland	**Registration:**	N323KT
Model/Series:	DHC-2	**Aircraft Category:**	Airplane
Year of Manufacture:	1957	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1022
Landing Gear Type:	Tailwheel; Ski/wheel	**Seats:**	9
Date/Type of Last Inspection:	July 22, 2018 100 hour	**Certified Max Gross Wt.:**	5600 lbs
Time Since Last Inspection:	49 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	15495.6 Hrs as of last inspection	**Engine Manufacturer:**	Pratt & Whitney
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	R-985
Registered Owner:	Rust Properties LLC	**Rated Power:**	450 Horsepower
Operator:	K2 Aviation	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	K2 Aviation	**Operator Designator Code:**	ERHA

The accident airplane was manufactured in 1957. At the time of the most recent 100-hour inspection on July 22, 2018, the airplane had a total time in service of 15,495.6 flight hours. At the time of the accident, the airplane had accrued 48.6 flight hours since the 100-hour inspection.

The airplane was equipped with a Pratt and Whitney R-985 radial engine rated at 450 horsepower. The engine was overhauled 1,113.4 hours before the accident flight. The engine had a total time in service of 2,471.6 hours.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TKA,365 ft msl	**Distance from Accident Site:**	50 Nautical Miles
Observation Time:		**Direction from Accident Site:**	150°
Lowest Cloud Condition:	Scattered / 8000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	Unknown / Unknown
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	22°C / 12°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Talkeetna, AK (TKA)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Talkeetna, AK (TKA)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

The station models in the vicinity of the accident site about the time of the accident depicted light winds, broken to overcast clouds, and temperatures between 58°F and 64°F. Farther north and northeast of the accident site, the stations at McKinley Park Airport (PAIN) and Ft. Greely (PABI) both reported moderate rain at the time of the accident.

The Alaskan Surface Analysis chart for 1900 depicted a developing stationary front to the north of the accident site with a high-pressure system at 1018-hectopascals (hPa) to the south along the coastal section. A Global Data Assimilation System (GDAS) model sounding over the accident site for 1900 was obtained from the NOAA Air Resource Laboratory archive data and plotted on a Skew T log P diagram.

The estimated conditions at 11,000 ft mean sea level (msl) included temperature -1.9°C and dew point -2.4°C with a relative humidity of 96% and wind from 230° at 6 knots. The sounding estimated broken cloud bases at 700 ft above ground level (agl), overcast clouds at 1,000 ft agl with cloud tops to 21,000 ft, and higher clouds above. The freezing level was 9,866 ft msl and supported light-to-moderate rime icing in clouds and precipitation. The wind profile indicated light southwest surface winds that veered to the west with height.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	4 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	62.790279,-151.22528

The airplane was located on August 6 by a National Park Service (NPS) helicopter crew in a crevasse on a hanging glacier on Thunder Mountain (about 14 miles southwest of the Denali summit) at an elevation at about 10,920 ft msl. Due to the location of the wreckage, NTSB personnel were unable to access the accident site. The airplane was highly fragmented and the right wing had separated and fallen several hundred feet below the main wreckage. The fuselage was fractured aft of the trailing edge of the wing and the fuselage was splayed open with blown snow inside. An impact mark consistent with the right wing was visible in the snow, and the airplane appeared to have impacted in a near wings-level attitude.

Organizational and Management Information

Organizational Structure

According to the Rust's Flying Service director of operations, Rust's Flying Service operated 23 airplanes and employed about 30 pilots. Operations were conducted from Anchorage, Alaska, under the Rust's Flying Service name, while operations that originated in Talkeetna were operated under the name K2 Aviation. Management personnel oversaw both operations. The director of operations and the chief pilot were both located in Anchorage, and there was a base chief pilot in Talkeetna. Each operation had separate flight followers located at that operation's main base.

Route Selection

The K2 Aviation base chief pilot reported that glacier tour flights were not conducted over a fixed route; routes were subject to change at the pilot's discretion based on the weather conditions at the time of the flight to provide the best tour experience.

The chief pilot also stated that pilots were expected to report to base operations when changing the planned route of a flight; however, this was not a requirement contained within the company's general operations manual.

Risk Mitigation

When asked about company safety meetings, the director of operations stated that morning meetings were routinely conducted to discuss issues that may arise that day such as weather, aircraft, equipment, or staffing issues. He did not know if a meeting was conducted on the morning of the accident and stated that he did not call in for the meetings.

When asked if K2 Aviation completed formal, written preflight risk assessments, the director of operations stated that such assessments were a "conversation" between "the people who are involved and their experience and their insight." When asked if flight followers used a checklist for information to discuss with the pilot before a flight, he said there was nothing to his knowledge; the base chief pilot then confirmed that there was no such checklist. The director of operations stated that, if the flight follower had a question or concern about a flight, they could contact the base chief pilot to address those concerns.

Controlled Flight into Terrain (CFIT) Avoidance

The base chief pilot was asked to describe the CFIT training provided to pilots at K2 Aviation. He stated that it varied depending on the trainer and check airman but that "the idea" was to fabricate a realistic scenario and evaluate the pilot's response. He stated that, in ground school, pilots would watch a video regarding CFIT, which would be followed by a discussion. He stated that the GPS units installed in the airplanes provided positional awareness and that pilots were trained in the use of the GPS. " The base chief pilot also reported that pilots were not taught a standard CFIT escape maneuver because "it's never standard…the 180 [degree turn] is kind of the basic. And we go from that. Because that doesn't always work…But, you know, that's not always the best thing to do." He added that it was "thought-provoking" and instructors would continually develop new scenarios and ideas and it was not just "you flew in the clouds, let's do a 180 and go somewhere else….We teach more than that…"

Additional Information

Due to treacherous terrain at the accident site, a park ranger was suspended by a long line from a helicopter and positioned near the airplane. The ranger was able to locate the pilot and three of the passengers in the forward portion of the fuselage. Rapidly deteriorating weather conditions limited the initial on-scene time to about five minutes.

NPS conducted a second site assessment mission on August 10. During this mission, the final passenger was located in the aft section of the fuselage and was confirmed deceased.

In a public press statement, NPS stated that, due to the unique challenges posed by the steepness of terrain, the crevasse, avalanche hazard, and the condition of the airplane, recovery of the deceased and/or removal of the aircraft exceeded an acceptable level of risk; therefore, a recovery would not be attempted.

NPS rangers on an April 5, 2019 assessment flight reported that, during the winter, the hazardous hanging glacier at the accident site calved, releasing an estimated 4,000 to 6,000 tons of ice and debris.

NPS rangers did not observe any evidence of the wreckage near the crash site, in the steep fall line, or on the glacier surface over 3,600 ft below. Further inspection of high-definition digital imagery taken during the assessment flight confirmed that the wreckage was not visible on the mountain face or in the surface debris at the base of Thunder Mountain.

Administrative Information

Investigator In Charge (IIC):	Williams, David
Additional Participating Persons:	Greg Varner; FAA; Wasilla, AK Chris Wilson; K2 Aviation; Talkeetna, AK Matt Rigsby; FAA; Washington D.C. , DE
Original Publish Date:	December 16, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97999