Aviation Investigation Final Report

Location:	Bethel, Alaska	**Accident Number:**	ANC02FA014
Date & Time:	February 4, 2002, 10:42 Local	**Registration:**	N756HL
Aircraft:	Cessna 206	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The solo commerical pilot departed on a CFR 135 on-demand cargo/U.S. mail flight en route to a remote coastal village. The flight did not reach the destination. A search and rescue satellite received an ELT signal, and the wreckage was located about 80 miles from the departure airport, along the airplane's intended flight path. A pilot who departed about 25 minutes before the accident airplane, also en route to the same coastal village, characterized the weather conditions along the route as "low visibility with light snow squalls moving through the area." He added that flat light conditions made it very difficult to discern any topographic features. Another pilot who was transiting through the area in the opposite direction, about the time of the accident, characterized the weather conditions as overcast with ceilings ranging between 1,000 and 1,300 feet. As he approached the site where the wreckage was eventually discovered, he encountered momentary visibility restrictions due to fog and light snow. He added that flat light conditions made it very difficult to discern any topographic features among the featureless, snow-covered terrain. The pilot stated that he changed his route in order to avoid worsening weather conditions. The accident airplane was equipped with an avionics package provided by the FAA's Capstone Program. The Capstone Program is a joint industry/FAA demonstration program that includes global positioning system (GPS) avionics, weather and traffic information provided through automatic dependent surveillance-broadcast (ADS-B), and terrain information depicted on a multifunction display (MFD) installed in the cockpit. Terrain depiction information, based on GPS data, is one of several visual display options available to the pilot on the MFD. Damage to the accident airplane's MFD precluded a determination of the visual display option selected at the time of the accident. At the time of the accident, position information from ADS-B equipment in the airplane was being provided to the Air Route Traffic Control Center (ARTCC). The recorded ARTCC data were reviewed to determine the flight track of the accident airplane. The radar-like track depicted the accident airplane's takeoff from the departure airport, on a heading of approximately 300 degrees. While en route, the airplane climbed to an altitude of about 1,800 feet msl. As the track continued in a northwesterly direction and approached the accident site, a gradual descent

was noted. The radar-like track stopped approximately 1.8 miles east of the accident site, with a ground speed of approximately 108 knots. Examination of the accident site revealed physical evidence indicating the airplane impacted the ground on a southeasterly heading (directly opposite of the on-course heading for the intended flight) in a slight nose down attitude. No evidence of any pre-impact anomalies with the engine or airplane were noted.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's continued VFR flight into instrument meteorological conditions, and his failure to maintain adequate ground clearance, which resulted in an in flight collision with terrain. Factors associated with the accident were flat light conditions, and snow-covered terrain.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CRUISE

Findings
1. (F) LIGHT CONDITION - OTHER
2. (C) VFR FLIGHT INTO IMC - CONTINUED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: CRUISE

Findings
3. (F) TERRAIN CONDITION - SNOW COVERED
4. (C) CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On February 4, 2002, about 1042 Alaska standard time, a wheel-equipped Cessna 206 airplane, N756HL, was destroyed when the airplane collided with remote, snow-covered terrain, during cruise flight, about 80 nautical miles northwest of Bethel, Alaska. The airplane was being operated as a visual flight rules (VFR) on-demand cargo/U.S. mail flight under Title 14, CFR Part 135, when the accident occurred. The airplane was registered to a private individual, and operated by Flight Alaska, Inc., dba: Yute Air Alaska. The solo certificated commerical pilot received fatal injuries. Visual meteorological conditions prevailed at the departure airport, and no flight plan was filed. The flight originated at the Bethel Airport, Bethel, at 1004, and was en route to Chevak, Alaska.

According to the company's director of operations, when the flight failed to return to Bethel by 1430, company personnel initiated a phone search, and discovered that the flight had never reached Chevak. The flight was officially reported overdue to the Federal Aviation Administration (FAA) about 1545.

About 1209, an emergency locator transmitter (ELT) signal was received by a search and rescue satellite. Personnel from the Bethel wing of the Civil Air Patrol were dispatched to conduct an aerial search, and determine the source of the ELT signal. The Civil Air Patrol personnel reported that they were unable to complete the mission due to low clouds, low visibility, and icing conditions. At 1605, an Alaska Army National Guard HH-60 helicopter was dispatched from Bethel to begin an aerial search. The helicopter crew located the wreckage about 1650, about 70 miles east of Chevak, along the accident airplane's anticipated route of flight.

CREW INFORMATION

The pilot held a commerical pilot certificate with airplane single-engine land, single engine sea, and instrument airplane ratings. The most recent second-class medical certificate was issued to the pilot on April 6, 2001, and contained no limitations. No personal flight records were located for the pilot. According to company records, the pilot's total aeronautical experience consisted of 7,800 hours, of which 200 hours were accrued in the accident airplane make and model. In the preceding 90 and 30 days prior to the accident, the company listed the pilot's flight time as 20 and 10 hours, respectively. The operator hired the pilot on May 7, 2001. According to the operator's director of operations, prior to joining the company, the accident pilot had accrued extensive 14 CFR Part 135 experience flying in Alaska,. The pilot completed an airman competency/proficiency check flight under Title 14 CFR Part 135.293 (Initial and Recurrent Testing), and 135.299 (Pilot-in-Command Line Check), with the chief pilot for the

operator in a Cessna 207 airplane on April 25, 2001. In the remarks section of FAA form number 8410-3 (airman competency/proficiency check form), the chief pilot wrote: "Demonstrated instrument proficiency."

The accident flight was the pilot's first flight of the day.

AIRCRAFT INFORMATION

The airplane had accumulated a total time in service of 10,607.2 hours. The most recent 100 hour inspection was accomplished on November 29, 2001, 46.2 hours before the accident.

The engine had accrued a total time in service of 5,337.1 hours, and 844.5 hours since overhaul.

METEOROLOGICAL INFORMATION

According to the company's director of operations, the pilot obtained current weather information for Chevak from the flight-planning desk located at the operator's base of operation in Bethel. The director of operations reported that company operations personnel in Bethel collect this weather information by calling each village agent in the villages serviced by the operator.

In a written statement provided to the National Transportation Safety Board, the employee who prepared the weather information prior to the accident flight's departure, said that he called the village agent in Chevak about 0900, and requested the current weather conditions. He added that weather information and aircraft loading calculations were relayed to the accident pilot prior to his departure. According to company records provided by the operator, the 0900 weather for Chevak was reported as: Sky conditions and ceiling, 5,000 feet overcast; visibility, 20 statute miles; wind from the northeast at 10 knots.

The closest weather observation station to the accident site is Hooper Bay, Alaska, which is located about 60 nautical miles west of the accident site. On February 4, at 1035, an unaugmented AWOS was reporting, in part: Wind, 190 degrees (true) at 6 knots; visibility, missing; clouds, 100 feet overcast; temperature, 19 degrees F; dew point, 17 degrees F; altimeter, 28.93 inHg.

Bethel is located about 80 nautical miles southeast of the accident site. At 1053 an Aviation Routine Weather Report (METAR) was reporting, in part: Sky conditions and ceiling, 3,900 feet broken; visibility, 10 statute miles; wind, 050 degrees at 13 knots; temperature, 10 degrees F; dew point, minus 6 degrees F; altimeter, 28.90.

An area forecast for the Yukon-Kuskokwim Delta, issued on February 4, 2002, at 0545, and valid until 1800, was forecasting, in part: Clouds and weather, 2,000 feet scattered, 5,000 feet broken, tops at 8,000 feet, with layers above 26,000 feet.

An AIRMET valid until 0000, was forecasting mountain obscuration in clouds and precipitation along the pilot's planned route of flight, with occasional moderate rime icing conditions in the clouds from 1,200 feet to 10,000 feet.

A pilot who departed from Chevak about 1043 en route to Bethel, characterized the weather conditions between Bethel and the accident site as overcast with ceilings ranging between 1,000 and 1,300 feet. He said that as his flight progressed, and as he approached the site where the wreckage was eventually discovered, he encountered momentary visibility restrictions due to fog and light snow. He added that flat light conditions made it very difficult to discern any topographic features among the featureless, snow-covered terrain. The pilot stated that he changed his route in order to avoid worsening weather conditions.

A pilot who departed Bethel about 25 minutes before the accident airplane's departure, also en route to Chevak, characterized the weather conditions along the accident airplane's route as "low visibility with light snow squalls moving through the area." He added that flat light conditions made it very difficult to discern any topographic features. He said that with satisfactory weather conditions, and given the intended destination of the accident airplane, the standard route of flight would be directly over the flat, featureless area where the accident occurred.

COMMUNICATIONS

Review of the air-ground radio communications tapes maintained by the FAA at the Bethel Flight Service Station (FSS) facility, revealed that just before takeoff from Bethel, the pilot communicated with the local ground and tower control positions. After departure, no further communications were received from the accident airplane.

A transcript of the air to ground communications between the airplane and Bethel local control is included in the public docket for this accident.

WRECKAGE AND IMPACT INFORMATION

The National Transportation Safety Board (NTSB) investigator-in-charge, along with an additional NTSB investigator, and the operator's chief pilot, examined the wreckage at the accident site on February 6, 2002. About 2 inches of snow had fallen at the wreckage site since the accident. A depression in the snow, followed by a path of wreckage debris to the main wreckage point of rest, was observed on a magnetic heading of approximately 095 degrees, consistent with the airplane impacting the ground on a southeasterly heading (opposite of the on-course heading for the intended flight).

The first observed point of impact was the semi-circular depression noted above. It was about four feet wide and eight feet long. Two smaller impressions were observed on either side of the main depression. The first portion of the airplane located along the wreckage path was the

right-side fuselage step. The step was located within the initial impact depression. About 20 feet beyond the depression was the aft section of the airplane's right-side cargo door. Additional portions of the airplane were found along the wreckage path, and included, in the order observed: right elevator, portions of the upper engine cowling, the right wingtip fairing, the nose wheel strut, the right main landing gear leg, the forward section of the right-side cargo door, fragments of the engine mount, nose cargo door and nose wheel, portions of the nose/engine keel structure, and propeller.

The main wreckage came to rest about 250 feet from the initial impact depression. The airplane was lying inverted. Both wings remained attached to the fuselage.

Both wing lift struts were attached to the wing, but separated from the fuselage. Both wings displayed extensive aft crushing of the leading edges.

The empennage, just forward of the vertical stabilizer attach point, was twisted and buckled to the left. The empennage came to rest in an upright position. Both horizontal stabilizers sustained extensive aft crushing of the leading edges. The vertical stabilizer and rudder were free of any major damage.

The flap jackscrew actuator was in the retracted position. According to the airplane manufacturer, the flap jackscrew extension corresponded to a zero flap condition.

The propeller hub assembly separated from the engine at the engine crankshaft propeller flange. The propeller was located about 204 feet from the initial observed point of impact. All six bolts attaching the propeller to the crankshaft flange were sheared. All three propeller blades were retained in the hub, but were loose and rotated within the hub. The first propeller blade had about 90 degree aft bending and aft curling at the tip. The leading edge had file marks, and a gouge about 10 inches inboard from the tip, but was generally free of damage. Minor paint removal was evident about 8 inches inboard from the tip, with minor scuffing along the upper surface of the blade. The second blade had an aft 90 degree bend, about 10 inches inboard from the tip. Spanwise scuffing and scratching were observed about two inches inboard from the tip. The third blade had an aft 90 degree bend, about 8 inches inboard from the tip. The blade had significant torsional twisting, and minor scuffing at the tip. The leading edge had file marks, but no chordwise scratching or gouging.

The engine separated from the fuselage, and was located about 5 feet from the fuselage, and about 245 feet from the initial observed point of impact. It sustained impact damage to the underside, and front portion of the engine oil sump. The exhaust tubes had minor bending and denting without sharp creases. The muffler tube extensions were crushed and flattened. The creases and folds of the metal were not cracked or broken.

Flight control system cable continuity was established from each control surface to the point of impact-related damage.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was conducted under the authority of the Alaska State Medical Examiner, 4500 South Boniface Parkway, Anchorage, Alaska, on, February 6, 2002. The cause of death was attributed to multiple impact injuries.

A toxicological examination was conducted by the FAA's Civil Aero medical Institute (CAMI) on March 21, 2002, and was negative for drugs or alcohol.

TEST AND RESEARCH

On March 5, 2002, under the supervision of the NTSB investigator-in-charge, an engine teardown and inspection was conducted at Alaskan Aircraft Engines, Inc., Anchorage, Alaska. No evidence of any preimpact engine anomalies was discovered.

ADDITIONAL INFORMATION

The airplane was equipped with an avionics package provided by the Federal Aviation Administration's Capstone Program. The Capstone Program is a joint industry/FAA demonstration program that features, among others, global positioning system (GPS) avionics, weather and traffic information provided through automatic dependent surveillance-broadcast (ADS-B), traffic information service-broadcast (TIS-B) equipment, and terrain information depicted on a multifunction display (MFD) installed in the cockpit. The Capstone program can provide radar-like services to participating air carrier aircraft operating in a non-radar environment of Western Alaska. At the time of the accident, position information from Capstone equipped airplanes, to the Anchorage Air Route Traffic Control Center (ARTCC), Anchorage, Alaska, was provided by the ADS-B equipment in the airplane, and required ground based radio repeater sites to facilitate the transmittal of position data.

Terrain depiction information, based on GPS data, is one of several visual display options available to the pilot on the MFD. Other options include custom maps, VFR sectional charts with topographical features, IFR charts, flight plan and traffic information, and weather data. The airplane's position can be displayed in relation to its location over the terrain, and may include bearing and distance information to selected points. Selection of the terrain mode for display, provides the pilot with color shading, depicting areas of terrain that are black (2,000 feet below the aircraft), green (between 2,000 and 700 feet below the aircraft), yellow (between 700 and 300 feet below the aircraft), and red (at or within 300 feet of the aircraft). Accurate depiction of terrain (in the terrain mode) requires the pilot to manually set a barometric pressure setting in the multifunction display menu. The Capstone avionics equipment does not automatically receive barometric pressure data from the aircraft's altimeter. Selection of the map mode does not provide any terrain warning/awareness information. Damage to the accident airplane's MFD precluded a determination of the visual display option selected at the time of the accident.

The recorded ARTCC data were reviewed by National Transportation Safety Board investigators to determine the flight track of the accident airplane. The radar-like track from the accident airplane, identified as Yute 6HL, depicted the accident airplane's departure from the Bethel Airport area on a heading of approximately 300 degrees. While en route to Chevak, the airplane climbed to an altitude of about 1,800 feet msl. As the track continued in a northwesterly direction and approached the accident site, a gradual descent was noted. The radar-like track stopped at approximately 1040, about 1.8 miles east of the accident site, with a ground speed of approximately 108 knots, and an altitude of 1,475 feet msl. The accident site elevation was 42 feet msl.

WRECKAGE RELEASE

The Safety Board released the airplane wreckage to the owner's representative on February 6, 2002. On August 7, 2002, the FAA owned Capstone Program equipment, consisting of an Apollo GX-60 GPS, a Multifunction Display (MFD), and a Universal Access Transceiver (UAT), was returned to the Capstone Program office located in Anchorage, Alaska.

Pilot Information

Certificate:	Commercial	**Age:**	52,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:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	April 6, 2001
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 25, 2001
Flight Time:	7800 hours (Total, all aircraft), 200 hours (Total, this make and model), 7500 hours (Pilot In Command, all aircraft), 20 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N756HL
Model/Series:	206	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	U20604103
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	November 29, 2001 100 hour	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	46.2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1051 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	IO-520-F
Registered Owner:	David E. Sandlin	**Rated Power:**	300 Horsepower
Operator:	Flight Alaska, Inc.	**Operating Certificate(s) Held:**	Commuter air carrier (135), On-demand air taxi (135)
Operator Does Business As:	Yute Air Alaska	**Operator Designator Code:**	YUAA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PAHP,18 ft msl	**Distance from Accident Site:**	60 Nautical Miles
Observation Time:	10:35 Local	**Direction from Accident Site:**	80°
Lowest Cloud Condition:		**Visibility**	
Lowest Ceiling:	Overcast / 100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	28.93 inches Hg	**Temperature/Dew Point:**	-7°C / -8°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	Bethel , AK (BET)	**Type of Flight Plan Filed:**	None
Destination:	Chevak, AK (VAK)	**Type of Clearance:**	None
Departure Time:	10:04 Local	**Type of Airspace:**	Class E

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:**	61.267223,-164.26361

Administrative Information

Investigator In Charge (IIC):	Johnson, Clinton
Additional Participating Persons:	Robert J Mercer; Federal Aviation Administration; Anchorage , AK Larry R Lewis ; National Transportation Safety Board; Anchorage , AK Robert C Nelson ; Flight Alaska, Inc. ; Anchorage , AK
Original Publish Date:	April 29, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=54172