National Transportation Safety Board
Aviation Accident Final Report

Location:	Sand Point, Alaska	**Accident Number:**	ANC10FA014
Date & Time:	January 21, 2010, 23:45 Local	**Registration:**	N112AX
Aircraft:	Beech 1900C	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The crew departed on a commercial cargo flight during dark night, visual meteorological conditions on an instrument flight rules flight plan. The departure end of the runway is adjacent to an ocean bay, and wind gusts up to 26 knots were reported. Local residents north of the airport reported stronger wind, estimated between 50 and 60 knots. A fuel truck operator, who was familiar with the crew's normal routine, reported that, before the airplane taxied to the runway, it remained on the ramp for 6 or 8 minutes with both engines operating, which he described as very unusual. There were no reports of radio communications with the flight crew after the airplane departed. The airplane crashed about 1 mile offshore, and the fragmented wreckage sank in ocean water. Because of the fragmented nature of the wreckage and ocean current, the complete wreckage was not recovered. The cockpit area forward of the wings was extensively fragmented, thus the validity of any postaccident cockpit and instrument findings was unreliable. Likewise, structural damage to the airframe precluded determining flight control continuity. Both propellers had witness marks consistent with operating under engine power and within their normal operating range. A postaccident examination of the engines and recovered components did not disclose any evidence of a mechanical malfunction. Due to the lack of mechanical deficiencies of the engines and propellers, and the extensive airframe fragmentation consistent with a high-speed water impact, it is likely that the crew had an in-flight loss of control of an unknown origin before impact.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An in-flight loss of control for an undetermined reason, which resulted in an uncontrolled descent.

Findings

Not determined	(general) - Unknown/Not determined
Aircraft	(general) - Not specified

Factual Information

HISTORY OF FLIGHT

On January 21, 2010, about 2345 Alaska standard time, a twin-engine turboprop Beech 1900C airplane, N112AX, sustained substantial damage when it crashed in the ocean shortly after takeoff from Runway 31 at the Sand Point Airport, Sand Point, Alaska. The airplane was operated as Flight 22, by Alaska Central Express, Inc., Anchorage, Alaska, as an on-demand cargo flight under the provisions of 14 Code of Federal Regulations (CFR) Part 135. The airline transport certificated captain and the commercial certificated first officer sustained fatal injuries. Dark night, visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan had been filed for the flight to the Ted Stevens Anchorage International Airport, Anchorage. The accident flight was the crew's last flight of the day. They had originally departed Anchorage about 1830, and made stops in Aniak, Bethel, and Cold Bay, Alaska, before arriving at Sand Point.

A postaccident review of the radio communication recordings maintained by the Federal Aviation Administration (FAA) revealed that the captain contacted the Anchorage air route traffic control center (ARTCC) about 2336 to request an IFR clearance for the flight from Sand Point to Anchorage. His request was granted, and he was instructed to contact ARTCC after departure from Sand Point. According to the ARTCC specialist on duty, no further radio communications were received from the accident airplane.

During on-scene interviews by the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on January 27, 2010, two witnesses who were standing outside a home along the shoreline about 1 mile north of the Sand Point Airport, reported hearing what they believed was the accident airplane as it departed. Both witnesses reported that as the airplane's takeoff progressed, the engine noise suddenly changed, followed by a very loud sound of impact and then silence. One of the witnesses said that just before hearing the impact, he momentarily saw the lights of the airplane descend into the ocean. The witnesses called 911 to report the accident. Both witnesses said that wind at the time was very strong out of the north, estimated between 50 and 60 knots.

The U.S. Coast Guard's Air Station Kodiak was notified that an airplane had crashed in the water just north of the departure end of Runway 31. The Coast Guard initiated an emergency response and dispatched an HH-60J rescue helicopter from Air Station Kodiak, which is about 303 miles northeast of Sand Point. Volunteer search personnel located floating debris, including the first officer's flight bag, in the area north of the airport but found no survivors.

On January 24, 2010, recovery personnel located the submerged airplane wreckage in about 45 feet of water, about 1 mile north of the departure end of Runway 31. The bodies of both pilots were recovered.

Cargo / Fuel Loading

During an interview with the NTSB IIC on January 25, 2010, the shipping agent and fuel

vendor for Alaska Central Express in Sand Point reported that when the accident airplane arrived, the captain requested 140 gallons of fuel. The fuel vendor said that while he was adding 70 gallons of fuel to each main fuel tank, the pilots, assisted by the fuel vendor's brother, loaded 52 boxes of cod milt aboard the airplane. The fuel vendor noted that after he fueled the airplane, he watched the pilots and his brother finish loading the last of the boxes, but that neither he nor his brother noted where the pilots distributed the boxes within the airplane.

The fuel vendor said that when the loading was complete, the pilots boarded the airplane and started both engines. He reported that in most cases, departing airplanes begin taxiing to the runway very soon after the engines are started but that this airplane remained on the ramp for 6 or 8 minutes, which he described as "very unusual." He said that just as he started walking towards the airplane to investigate, the airplane began to taxi toward the runway. The fuel vendor said that once the airplane began to taxi, he left the airport.

CREW INFORMATION

Captain

The captain, age 28, held an airline transport pilot certificate with an airplane multiengine land rating, and held commercial pilot privileges with an airplane single-engine land rating. He also held a type rating for Beech 1900 airplanes and a flight instructor certificate with an airplane single-engine land rating. His most recent first-class medical certificate was issued July 24, 2009, and contained no limitations.

In the three days prior to the accident, on January 18, the captain's duty day started at 1100 and ended at 1600, and he flew 3.1 hours. On January 19, his duty day started at 1230 and ended at 2100, and he flew 6.1 hours. On January 20, his duty day started at 1330 and ended at 2130, and he flew 5.7 hours. On the day of the accident, January 21, his duty day started about 1730, and he flew about 6.0 hours before the accident.

According to the NTSB Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1) submitted by the operator, the captain's total flight time was 3,700 hours, of which 3,080 were in the accident airplane make and model. His most recent airman competency/proficiency check (14 CFR 135.293) check ride was on May 31, 2009. A company check airman administered the check ride.

According to the operator, the captain was hired by the company on August 26, 2007, and at that time, his total flight experience was 670 hours. He completed his initial company training, including Beech 1900 second-in-command (SIC) ground and flight training, on August 28, 2007, and was assigned to fly as second-in-command of Beech 1900 airplanes at the company base in Anchorage. On June 17, 2008, he was upgraded to captain of Beech 1900 airplanes.

First Officer

The first officer, age 23, held a commercial pilot certificate with airplane single-engine land, multiengine land, and instrument airplane ratings. Her most recent second-class medical

certificate was issued May 4, 2009, and contained no limitations.

In the three days prior to the accident, the first officer was off duty on January 18. On January 19, her duty day started at 1430 and ended at 2230, and she flew 5.5 hours. On January 20, her duty day started at 1230 and ended at 2230, and she flew 6.5 hours. On the accident date of January 21, her duty day started about 1730, and she flew about 6.0 hours before the accident.

According to the NTSB Form 6120.1 submitted by the operator, the first officer's total flight time was about 1,000 hours, of which 280 were in the accident airplane make and model. Her most recent airman competency/proficiency check (14 CFR 135.293) check ride was in the accident airplane on September 7, 2009. A company check airman administered the check ride.

According to the operator, the first officer was hired by the company on August 24, 2009, and at that time, her total flight experience was 720 hours. She completed her initial company training, including Beech 1900 SIC pilot ground and flight training, on September 7, 2009, and was assigned to fly Beech 1900 airplanes at the company's base in Anchorage.

Company Information

The operator is a 14 CFR Part 135 air carrier and holds on-demand operations specifications. It has facilities at Anchorage and serves various communities throughout the Aleutian Islands and western, southwestern, and southeast Alaska. The president, chief pilot, director of maintenance, and chief inspector all reside in Anchorage.

A review of the company's FAA-approved operations manual revealed that the director of maintenance, director of operations, chief pilot, and the chief inspector are designated as having the authority of exercising operational control over company aircraft and/or flight crews.

AIRCRAFT INFORMATION

The airplane was a pressurized, twin-engine turboprop equipped with Pratt & Whitney PT6A-65B engines that produce 1,100 horsepower each. Each engine was outfitted with a Hartzell HC-B4MP-3A four-bladed propeller with composite blades.

The airplane did not have, and was not required to have, a cockpit voice recorder or a flight data recorder. The airplane was equipped for instrument flight into known icing conditions and may be operated by a single pilot.

The airplane was maintained on a continuous airworthiness maintenance program (CAMP). The CAMP is divided into phase inspections, each consisting of six event cycles that are 200 hours apart. A complete inspection cycle is 1,200 hours or 24 months.

Examination of the maintenance records revealed that CAMP event number five inspection was accomplished on January 18, 2010, about 37.6 hours before the accident. The airplane had a total time in service of 56,184.4 flight hours. The left engine had a total time of 45,158.0 flight hours, 6,257.5 flight hours since overhaul, and the right engine had a total time of 49,552.2

flight hours, 7,500.6 flight hours since overhaul. The left propeller had 1,537.1 flight hours since overhaul, and the right propeller had 2,236.4 flight hours since overhaul.

METEOROLOGICAL INFORMATION

The closest official weather observation station is at the Sand Point Airport. At 2356, an aviation routine weather report (METAR) reported, in part: Wind from 330 degrees (true) at 19 knots with gusts to 26 knots; visibility, 8 statute miles; clouds and sky condition, 2,000 feet broken, 2,800 feet overcast; temperature, 23 degrees F; dew point, 18 degrees F; altimeter, 29.91 inHg.

Residents of Sand Point reported that winds are consistently stronger to the north of the Sand Point Airport, which was generally the direction that the accident flight would have flown.

COMMUNICATIONS

There were no reports of communications with the flight after the airplane departed Sand Point.

AERODROME AND GROUND FACILITIES

The Sand Point Airport is equipped with a single, hard-surfaced runway on a 130/310-degree magnetic orientation. Runway 31 is 5,213 feet long by 150 feet wide. The departure end of runway 31 is positioned at the edge of Popof Straits.

WRECKAGE AND IMPACT INFORMATION

On January 24 and 25, 2010, recovery crews and a diver recovered the severely fragmented wreckage from the ocean floor, and transported it to Sand Point.

The recovery diver noted that the Popof Straits have very strong tidal currents. He said that most of the wreckage was found within an area that measured about 90 feet in diameter but that lighter parts of the wreckage were found scattered outside of the main wreckage area. The diver also reported that due to time and visibility limitations during the recovery efforts, he was unable to recover the airplane's nose landing gear assembly, and other fragmented parts of the airplane.

Most of the airplane's major components were recovered from the wreckage site. Items that were not found or recovered were the right aileron, the outboard portion of the left aileron, the nose section forward of the front pressure bulkhead, and an 8-foot section of the left wing. (A detailed recovery sketch is included in the public docket for this accident.)

On January 27 and 28, 2010, a wreckage examination and layout was done under the direction of the NTSB IIC. Two FAA aviation safety inspectors from the Anchorage Flight Standards District Office, air safety investigators from Hawker Beechcraft and Pratt & Whitney Canada, and representatives from Alaska Central Express assisted the NTSB IIC.

The one-piece wing assembly was found fragmented and separated from its mid-fuselage attaching point. The left wing was found within the wreckage site, and it was fragmented into two main sections. The right wing was fragmented into three main sections, with only portions of the upper and lower skins attached. As mentioned, the outboard portion of the left wing and the left aileron were not recovered, and the right aileron was also not recovered.

The airplane's left engine was separated from the firewall, and it sustained significant impact damage to the front and underside portions. The reduction gearbox was separated at the front housing, and the left propeller shaft and hub assemblies remained attached to the reduction gearbox housing. Two of the four composite propeller blades were broken off adjacent to the propeller hub. The other two propeller blades were broken off about 28 and 43 inches outboard from the propeller hub, and both displayed significant “broomstraw” damage to the composite material. The left propeller was found in the "feathered" position at recovery.

The airplane's right engine was separated from the firewall, and it sustained significant impact damage to the front and underside portions. The right propeller hub remained attached to the reduction gearbox. Three of the four composite propeller blades were broken off adjacent to the propeller hub, and the fourth propeller blade was broken off about 25 inches outboard from the propeller hub.

The airplane's nose and cockpit area showed extensive crush damage and fragmentation that extended aft beyond the airplane's main entry door. Only fragmented portions of the airplane's nose and cockpit structure was recovered. However, portions of the avionics bay, crew seats, and instrument panel, including some radios, were recovered with other portions of the wreckage.

Small, fragmented portions of the airplane's crew entry door were recovered, along with two folding footsteps which are part of the entry door system. The airplane's cargo door was fragmented, and the locking mechanism was in the locked position. The cargo door's upper hinge mechanism was separated from the fuselage attach points.

The airplane's empennage was separated just aft of the cargo door.

Airframe fragmentation precluded determining control continuity to the point of impact damage. The flap jackscrew mechanism in each wing was in the flaps-up position.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examinations of the captain and first officer were conducted under the authority of the Alaska State Medical Examiner, Anchorage, Alaska, on January 26, 2010. The cause of death for both pilots was attributed to blunt force, traumatic injuries.

The FAA's Civil Aeromedical Institute performed toxicological examinations for both pilots on February 26, 2010. Both were negative for alcohol and drugs.

TESTS AND RESEARCH

Engines

On April 21-23, 2010, at the direction and under the supervision of the NTSB IIC, both engines were disassembled and examined at Pratt & Whitney Canada, St. Hubert, Quebec, Canada.

The examinations revealed that both engines had circumferential scoring marks to the internal rotating components, consistent with engines that are developing power at the time of water impact. Additionally, both engines had deformation to their first stage compressor blades, with contact signatures to their compressor axial stages, compressor impellers, and shrouds.

On August 10, 2011, a senior NTSB powerplants investigator, and a senior NTSB materials engineer reexamined the left engine's fractured second stage power turbine blades, at the NTSB's Washington D.C. materials laboratory. The examination revealed that there was no evidence of preexisting damage such as fatigue cracking on any of the turbine blade fracture surfaces.

There was no evidence of any preimpact mechanical anomalies found with either engine. (A synopsis of the NTSB powerplants investigator's case review is included in the public docket for this accident.)

Propellers

On April 19, 2010, at the direction and under the supervision of the NTSB IIC, both propeller hubs were disassembled and examined at Hartzell Propeller, Inc., Piqua, Ohio.

The examinations revealed evidence that both propellers were rotating and not feathered at the time of impact. Damage and witness marks revealed that both propellers were at a blade angle in the normal operating range above the flight idle position at the time of impact, consistent with engine power on. No evidence of preimpact mechanical anomalies was found.

Engine Trend Monitoring System

The airplane was equipped with an Altair Avionics / Pratt & Whitney engine trend monitoring system, capable of recording engine trend and exceedance data. The trend monitoring unit was found badly damaged and loose within the recovered wreckage items. It was shipped in a sealed shipping container to the FAA's Burlington, Massachusetts, Manufacturing Inspection District Office (MIDO). The examination was performed at the Altair / Pratt & Whitney facility in Norwood, Massachusetts.

On February 3, 2010, at the direction and under the supervision of an FAA avionics safety inspector, the twisted and distorted aluminum outer shell of the trend monitoring unit was cut open, and the internal circuit boards were removed. The FAA avionics safety inspector reported that the impact damage precluded the recovery of any engine performance data.

Cockpit Instrumentation

On April 14, 2010, the electric-driven gyroscopic attitude indicator from the left side of

instrument panel, vacuum-driven gyroscopic attitude indicator from the right side of the instrument panel, a horizontal situation indicator (HSI), and a radio magnetic indicator (RMI) were all disassembled and examined under the direction of the NTSB IIC at Aircraft Instrument Repair, Inc., Anchorage, Alaska. In attendance were an airworthiness inspector from the FAA's Anchorage FSDO and a representative from Alaska Central Express.

Both attitude indicators sustained extensive impact damage. The case of the electric-driven indicator was severely twisted and distorted, and most of the internal components, including the gimbal housing assembly, were not recovered. The vacuum-driven indicator showed rotational scoring marks on the gimbal and gimbal housing assembly. The badly damaged RMI and HSI both indicated a magnetic heading consistent with a northerly flight course.

Enhanced Ground Proximity Warning System

The airplane was equipped with a Honeywell Aerospace Enhanced Ground Proximity Warning System (EGPWS) capable of recording aircraft inputs such as position, attitude, airspeed, and glideslope data, along with basic engine performance data.

The damaged EGPWS unit was found in the wreckage. It was shipped in a sealed shipping container to the NTSB's Western Pacific Office, Seattle, Washington. An NTSB air safety investigator delivered the EGPWS unit to Honeywell International's facility in Redmond, Washington.

On February 3, 2010, under the supervision of the NTSB air safety investigator, the damaged EGPWS unit was examined by a Honeywell technical engineer who determined that the internal Numonyx flash memory chip was damaged, which precluded the recovery of any data. The damaged memory chip was removed from the EGPWS unit and sent to Numonyx, Inc., in Folsom, California in an attempt to recover the data. On May 5, 2010, a technician from Numonyx, Inc., examined the damaged flash memory chip using acoustic microcopy. He discovered two cracks in the memory chip's die, which precluded the recovery of any data.

Weight and balance

According to the airplane manufacturer, the Beech 1900C's maximum takeoff gross weight is 16,600 pounds. The accident airplane had been modified to allow operations at a maximum gross weight of 17,600 pounds.

According to the operator's maintenance personnel, the airplane's basic operating weight was 9,423 pounds.

The fuel vendor in Sand Point said he added 140 gallons of Jet A turbine fuel between the two inboard auxiliary fuel tanks.

According to cargo manifests that were provided to the NTSB by the operator, the total cargo weight on board at the time of the accident was 5,319 pounds.

The estimated gross weight of the airplane at takeoff was 16,207 pounds, or approximately

1,393 pounds below the maximum takeoff gross weight of 17,600 pounds. The cargo was not recovered, and the exact location/station of the cargo could not be determined.

Fuel Consumption Calculations

Fuel consumption calculations were provided by the airplane manufacturer and reviewed by the NTSB IIC. All of the fuel consumption calculations were based on the operator's fueling records, which were then provided to the NTSB. According to the calculations, the airplane would have required an additional 249 pounds of fuel (37.16 gallons) to complete the flight from Sand Point to Anchorage, nor did it have the mandatory 45 minute IFR fuel reserve as required by 14 CFR Part 91.167, entitled "Fuel Requirements For Flight In IFR Conditions." (Copies of the manufacturer's fuel consumption calculations are included in the public docket for this accident.)

ADDITIONAL INFORMATION

According to Alaska Central Express, Inc. management personnel, following this accident, the board of directors have opted to install cockpit image recording systems in all company owned and operated aircraft.

History of Flight

Initial climb	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Airline transport	**Age:**	28,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	July 24, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 31, 2009
Flight Time:	3700 hours (Total, all aircraft), 3080 hours (Total, this make and model), 2400 hours (Pilot In Command, all aircraft), 300 hours (Last 90 days, all aircraft), 112 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Co-pilot Information

Certificate:	Commercial	**Age:**	23,Female
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	May 4, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 7, 2009
Flight Time:	1000 hours (Total, all aircraft), 280 hours (Total, this make and model), 180 hours (Last 90 days, all aircraft), 84 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N112AX
Model/Series:	1900C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	UC-45
Landing Gear Type:		**Seats:**	19
Date/Type of Last Inspection:	January 18, 2010 Continuous airworthiness	**Certified Max Gross Wt.:**	17600 lbs
Time Since Last Inspection:	38 Hrs	**Engines:**	2 Turbo prop
Airframe Total Time:	56184 Hrs at time of accident	**Engine Manufacturer:**	Pratt & Whitney
ELT:	C91 installed, not activated	**Engine Model/Series:**	PT6A-65B
Registered Owner:		**Rated Power:**	1100 Horsepower
Operator:		**Operating Certificate(s) Held:**	On-demand air taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	SDP,21 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	23:56 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:		**Visibility**	8 miles
Lowest Ceiling:	Broken / 2000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	19 knots / 26 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	-5°C / -8°C
Precipitation and Obscuration:			
Departure Point:	Sand Point, AK	**Type of Flight Plan Filed:**	IFR
Destination:	Anchorage, AK (ANC)	**Type of Clearance:**	IFR
Departure Time:	23:45 Local	**Type of Airspace:**	

Airport Information

Airport:	Sand Point SPD	**Runway Surface Type:**	Asphalt
Airport Elevation:	21 ft msl	**Runway Surface Condition:**	
Runway Used:	31	**IFR Approach:**	None
Runway Length/Width:	5213 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	55.332778,-160.541107(est)

Administrative Information

Investigator In Charge (IIC):	Johnson, Clinton
Additional Participating Persons:	Steve Fortenberry; Federal Aviation Administration (Operations); Anchorage, AK Roy L Redifer; Federal Aviation Administration (Airworthiness); Anchorage, AK Michael Yorke; Federal Aviation Administration (Operations); Anchorage, AK Michael Murphy; Alaska Central Express - Director of Operations; Anchorage, AK Ernest Hall; Hawker Beechcraft Corporation; Wichita, KS Jacob Fruhling; Pratt & Whitney USA; Vancouver, WA Tom McCreary; Hartzell Propeller, Inc.; Piqua, OH Steven A Krugler; Woodward, Inc.; Rockford, IL
Original Publish Date:	March 8, 2012
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=75303