Aviation Investigation Final Report

Location:	Wasilla, Alaska	**Accident Number:**	ANC15FA009
Date & Time:	January 31, 2015, 13:05 Local	**Registration:**	N82735
Aircraft:	Piper PA 18	**Aircraft Damage:**	Substantial
Defining Event:	Midair collision	**Injuries:**	1 Serious
Flight Conducted Under:	Public aircraft		

Analysis

One commercial pilot was operating a Piper PA-18 "Super Cub" wheel/ski-equipped airplane as a cross-country public flight, and another commercial pilot was operating a Piper PA-18 "Super Cub" ski-equipped airplane as cross-country private flight in day, visual meteorological conditions. Multiple witnesses reported observing one of the airplanes (the wheel/ski-equipped airplane) traveling in a southwesterly direction and the other airplane traveling in a northwesterly direction. One witness said that, as the airplanes approached each other and converged, neither airplane changed altitude nor direction and that they subsequently collided at an approximate 90-degree angle. An examination of both airplanes revealed impact signatures consistent with each airplane colliding at an approximate 90-degree right angle, consistent with the witness's statement. After the collision, both aircraft descended uncontrolled into an area of densely populated trees and sustained substantial damage, and both pilot sustained serious injuries.

The pilot of the southwesterly bound airplane reported that, while in level cruise flight, the sun was at his 1130- to 1200-o'clock position; this likely resulted in sun glare. He added that he saw a momentary flash in the upper left corner of his windscreen, which was instantaneously followed by the collision. After the collision, his airplane entered an uncontrollable dive with no elevator control. In a final effort to regain control, he pushed the control stick forward, and he was able to regain limited elevator authority, but the airplane continued to descend, nose low, into the tree-covered terrain.

Probable Cause and Findings

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

Both pilots' inadequate visual lookout and failure to see and avoid each other while in level cruise flight, which resulted in a midair collision. Contributing to the accident was the obscuration of the pilot's visibility due to sun glare.

Findings

Personnel issues	Monitoring other aircraft - Pilot
Personnel issues	Monitoring other aircraft - Pilot of other aircraft
Environmental issues	Bright light - Effect on personnel

Factual Information

History of Flight

Enroute	Midair collision (Defining event)

HISTORY OF FLIGHT

On January 31, 2015, about 1305 Alaska standard time, a wheel/ski-equipped Piper PA-18 airplane, N82735, and a ski-equipped Piper PA-18 airplane, N78NR, collided midair near South Hollywood Airport, about 5 miles southwest of Wasilla, Alaska. N82735 was operated by the State of Alaska Department of Public Safety, Alaska State Troopers, Anchorage, Alaska as a visual flight rules (VFR) cross-country public-use flight, under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91, when the accident occurred. N78NR was registered to and operated by the pilot as a VFR cross-country flight under the provisions of Title 14 CFR Part 91. The sole occupants of the airplanes, both certificated commercial pilots, sustained serious injuries. After the collision, both aircraft descended uncontrolled into an area of densely populated birch and spruce trees and sustained substantial damage. Visual meteorological conditions prevailed in the area at the time of the accident. N82735 departed Wasilla Airport about 1300 bound for Beluga, Alaska, and company flight following procedures were in effect. N78NR departed Birchwood Airport, Chugiak, Alaska about 1250 destined for an off-airport landing site near Johnson Creek with no flight plan on file.

During on-scene interviews with the National Transportation Safety Board (NTSB) Investigator-in-Charge (IIC) on February 1, witnesses consistently reported that they observed one Piper PA-18 traveling in a southwesterly heading, and the other Piper PA-18 traveling in a northwesterly direction. One witness on the ground observed both airplanes converge at approximately a 90 degree angle. The witness said that as both airplanes converged, neither airplane changed altitude or direction as they approached each other, and the two subsequently collided.

During an interview with the NTSB IIC on February 1, a pilot-rated witness that was standing on the east end of South Hollywood Airport, who observed the airplanes just after the collision, stated that he recognized the Alaska State Trooper airplane. He said that after the collision the state trooper's airplane entered a spin, and it began a nose low, spiraling descent. As the airplane reached approximately 400 feet above ground level, the airplane recovered from the spin and briefly leveled off. This was followed by an increase in engine noise. The nose of the airplane then pitched abruptly down, and then the engine noise decreased, which was followed by the sound of the airplane impacting the tree-covered terrain. He said that after the midair collision, the other Piper PA-18 appeared to snap roll to the right as the airplane traveled away from his location. He then observed a large portion of that airplane's right wing flutter to the ground, as it entered a near vertical, uncontrolled, spiraling descent.

During a hospital room interview with the NTSB IIC on February 2, the Alaska State Trooper pilot of N82735 stated that after departure from the Wasilla Airport, he climbed the airplane to approximately 1,500 to 2,000 feet MSL, and configured the airplane for cruise flight. While in level cruise flight, traveling in a southwesterly heading, with the sun at his 1130 to 1200 o'clock position, he saw a

momentary flash in the upper left corner of his windscreen, which was instantaneously followed by the collision. After the collision his airplane entered an uncontrollable dive, with no elevator control. In a final effort to regain control, he pushed the control stick forward, and he was able to regain limited elevator authority, but the airplane continued to descend, nose low, into the tree-covered terrain. The last thing the trooper pilot remembered was entering the trees.

PERSONNEL INFORMATION

N82735 pilot:

At the time of the accident, the pilot of N82735 was employed by the State of Alaska Department of Public Safety, Alaska State Troopers as a Wildlife Trooper.

The pilot, age 35, holds a commercial pilot certificate with ratings for airplane single engine land, single engine sea and instrument airplane. His most recent second class medical certificate was issued on September 04, 2014, and contained the limitation that he must wear corrective lenses.

According to records provided by the State of Alaska Department of Public Safety, he had logged about 543 hours of flight experience at the time of the accident. He also passed a currency checkride on September 04, 2014.

N78NR pilot:

The pilot of N78NR, age 52, holds a commercial pilot certificate with an airplane single engine land rating with the limitation "the carriage of passengers for hire in airplanes on cross country flights in excess of 50 nautical miles or at night prohibited." His most recent third class medical certificate was issued on March 07, 2013, and contained the limitation that he must wear corrective lenses.

No personal flight records were located for the pilot, and the aeronautical experience listed on page 3 of this report was obtained from a review of the airman's Federal Aviation Adminitration (FAA) records on file in the Airman and Medical Records Center in Oklahoma City, Oklahoma. On the pilot's last application for a medical certificate, dated March 07, 2013, he indicated that his total aeronautical experience consisted of about 1400 hours.

AIRCRAFT INFORMATION

N82735:

The airplane was a Piper PA-18-150, manufactured in 1977 and equipped with a Lycoming O-320 series engine.

The colors of the airplane included a primary base color of white with red accent lines, red wings, and a red propeller spinner.

At the time of its last annual inspection, completed on October 14, 2014, the airplane had 7,851 hours in service.

N78NR:

The airplane was a Piper PA-18-150, manufactured in 1956 and equipped with a Lycoming O-320 series engine.

The colors of the airplane included a primary base color of white with red accent lines, white wings and a red propeller spinner.

No airplane and engine log books were discovered for examination.

METEOROLOGICAL INFORMATION

The closest weather reporting facility is Wasilla Airport, about 5 miles northeast of the accident sites. At 1256, an aviation routine weather report (METAR) at Wasilla, Alaska, reported: wind, 250 at 4 knots; visibility, 10 statute miles; sky condition, clear; temperature, 12 degrees F; dew point 1 degrees F; altimeter, 30.37 inHG.

COMMUNICATIONS

Both airplanes transceivers were recovered and sent to the NTSB Vehicle Recorders Laboratory in Washington, D.C. for recovery of the last active and standby frequencies.

Postaccident operational testing of the transceiver recovered from N82735 revealed a primary active radio frequency of 122.80 Mhz, and a non-active secondary frequency 135.25 Mhz.

Postaccident operational testing of the transceiver recovered from N78NR revealed a primary active radio frequency of 122.80 Mhz, and a non-active secondary frequency 123.00 Mhz.

In May of 2014, following a series of midair collisions in the Matanuska Susitna (Mat-Su) Valley, the FAA made significant changes to the common traffic advisory frequencies (CTAF) assigned north and west of Anchorage, AK. The FAA established geographic CTAF areas based, in part, on: flight patterns, traffic flow, private and public airports and off-airport landing sites. The CTAF for the area where the accident occurred was 122.80 Mhz.

Both airplanes were operating in "Class G" airspace, and there is no regulatory requirement for either airplane to be equipped with two-way radio communications.

WRECKAGE AND IMPACT INFORMATION

The NTSB IIC, along with three other NTSB investigators, a FAA safety inspector from the Anchorage Flight Standards District Office (FSDO), and the Alaska State Troopers reached the accident sites on the afternoon of January 31.

N82735:

All of the airplanes major components were located at the main wreckage site. The wreckage was located in an area of densely populated spruce and birch trees, on its left side at an elevation of about 335 feet mean sea level (MSL). The nose of the airplane was on about a 225 degree heading (All headings/bearings noted in this report are magnetic).

Numerous pieces of cut trees and brush were observed at the accident site, and on both the left and right side of the wreckage forward of the engine. Examination of these cuts revealed flat angular fractures with black paint transfer marks.

The cockpit area was extensively damaged. The engine and firewall were displaced upward and aft, and the instrument panel was displaced upward. The throttle was found in the near closed position. The mixture was full rich, and the carburetor heat was in the off position.

The exhaust tube had malleable bending and folding, producing sharp creases that were not cracked or broken along the creases.

The airplane's left wing separated near its fuselage attach points, exhibited extensive impact damage, and came to rest underneath and intertwined with the outboard portion of N78NR right wing. The wing strut remained attached to its respective wing and fuselage attach points, but was found embedded in the internal structure of N78NR right wing.

The airplane's severed right wing exhibited extensive impact damage, and came to rest inverted and parallel to the fuselage.

Both the left and right aileron remained attached to their respective attach points, but exhibited extensive spanwise accordion style crushing.

The left horizontal stabilizer and elevator remained attached to their respective attach points and were relatively undamaged. The right horizontal stabilizer exhibited extensive leading edge crushing along the entire span of the stabilizer. The right elevator exhibited spanwise bending from the tip inboard. The vertical stabilizer and rudder remained attached to their respective attach points, but exhibited extensive impact damage.

Both propeller blades remained attached to the engine crankshaft. One propeller blade exhibited leading edge gouging, substantial torsional "S" twisting and chordwise scratching. The other propeller blade exhibited slight torsional "S" twisting and chordwise scratching, with the propeller tip separating from the blade.

All the primary flight control surfaces were identified at the accident site, and flight control continuity was verified from all of the primary flight control surfaces to the cockpit.

The examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

N78NR:

All of the airplanes major components were found at the main wreckage site, with the exception of a large outboard portion of the airplanes right wing, which was located underneath and intertwined with the main wreckage on N82735.

The on-scene examination revealed that the airplane impacted in a near vertical attitude and came to rest inverted, in an area of densely populated spruce and birch trees, at an elevation of about 355 feet MSL. The nose of the airplane was on about a 240 degree heading.

The cockpit area was extensively damaged. The engine and firewall were displaced upward and to the left, and the instrument panel was displaced to the right. The throttle control separated from the cockpit and was found in the near-closed position.

The airplane's left wing remained attached to its respective attach points, but exhibited leading edge crushing and spanwise upward bending from about midspan outboard to the tip.

The airplanes right wing separated from the fuselage, and fragmented into two major sections. The inboard section came to rest about 97 feet from the main wreckage. The outboard section was located underneath and intertwined with the left wing from N82735. The right forward wing strut separated about nine inches from the wing attach point. A section of the right forward wing strut, about 21 inches long, was located near the wreckage. Examination of these separations revealed flat angular fractures with red paint transfer marks.

Both the left and right aileron remained attached to their respective attach points, but sustained impact damage.

The tail section separated from the empennage just forward of the vertical stabilizer and was severely fractured.

Both propeller blades remained attached to the engine crankshaft. One propeller blade was relatively undamaged. The other propeller blade exhibited aft bending that initiated about six inches from the propeller hub.

All the primary flight control surfaces were identified at the accident site, with the exception of the right aileron that was located at the accident site of N82735. Control continuity could not be established due to numerous fractures in the system, but all fractures exhibited features consistent with tension overload.

The examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

N82735

The FAA Civil Aeromedical Institute performed toxicology examinations for the pilot on March 02, 2015, which was negative for alcohol and drugs.

N78NR

The FAA Civil Aeromedical Institute performed toxicology examinations for the pilot on April 9, 2015, which was negative for ethanol. The examination revealed the presence of the following agents in the blood, and urine:

Etomidate detected in Serum

Ketamine detected in Blood

Etomidate is a short-acting intravenous anesthetic agent commonly used by first responders for the induction of general anesthesia and sedation.

Ketamine is an anesthetic agent and is commonly used as a dissociative sedative in emergency medicine.

SURVIVAL ASPECTS

N82735

At the time of the accident, the pilot of N82735 was utilizing a 4 point safety harness. The harness remained secure throughout the impact sequence and was cut by first responders during the extrication of the pilot.

In addition, the pilot was wearing a standard police issued Kevlar protective vest and a David Clark Series K10 helmet. Pieces of the fractured helmet were found in the cockpit area during the wreckage examination.

An Artex ME406 emergency locator transmitter (ELT) was located in the mounting cradle secured by approved Velcro® strapping. The cradle remained attached to the airframe and the antenna remained attached to both the fuselage and ELT device. Due to witnesses in the area at the time of the accident, the ELT did not aid in the search and rescue operation. When first responders arrived at the accident site, the ELT was transmitting.

N78NR

N78NR was equipped with a 4 point safety harness. It is unknown if it was in use at the time of the accident.

A 121.5 Mhz ELT was installed in the aircraft and activated during the impact sequence. As a result of the rapid response time by witnesses, the ELT did not aid in the search and rescue operation.

TESTS AND RESEARCH

Global Positioning System (GPS)

N78NR

At the time of the accident, the pilot was using a Garmin GPS 176 series portable GPS receiver, capable of storing route-of-flight data. The unit was sent to the NTSB's Vehicle Recorders Division for examination.

A NTSB electrical engineer was able to extract the GPS data for the accident flight, which included, in part, time, latitude, longitude, and GPS altitude. Groundspeed and course information were derived from the extracted parameters.

The GPS data logs for January 31, 2015, revealed the accident flight departed Birchwood Airport about 1250. After departure, the airplane proceeded northeast, before it turned northwest proceeding around the ocean waters of Knik Arm. Just prior to the collision, the airplane had climbed to a GPS altitude of

1,648 feet, and was continuing in a northwesterly direction at a groundspeed of 90 knots. The data log did not reveal an abrupt change in course or altitude prior to the collision.

A flight track map overlay, and tabular data corresponding to the accident flight are available in the public docket for this accident.

Lights

N82735

The left and right wingtip strobe assemblies were removed from the airplane and sent to the NTSB Materials Laboratory for further examination. Examination of the strobe lights revealed that the conductor within the flashtube was intact and appeared to be undamaged; the laboratory was unable to determine whether the strobe was activated or illuminated at the time of the accident.

N78NR

In addition to the aforementioned tests/inspections, the landing light, taxi light and left navigation light were removed from N78NR and inspected to determine if there had been any filament stretch at the moment of impact (indicating the light may have been illuminated). All three bulbs were sent to the NTSB Materials Laboratory for further examination. None of the bulbs showed any clear indication of filament stretch or filament contact with the inside of the glass bulb surface.

Pilot Information

Certificate:	Commercial	**Age:**	35,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	September 4, 2014
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 4, 2014
Flight Time:	543 hours (Total, all aircraft), 192 hours (Total, this make and model), 539 hours (Pilot In Command, all aircraft), 6 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N82735
Model/Series:	PA 18	**Aircraft Category:**	Airplane
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18-7709183
Landing Gear Type:	Tailwheel; Ski/wheel	**Seats:**	2
Date/Type of Last Inspection:	October 14, 2014 Annual	**Certified Max Gross Wt.:**	1750 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	7851.8 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-320 SERIES
Registered Owner:	STATE OF ALASKA / Alaska State Troopers	**Rated Power:**	0 Horsepower
Operator:	STATE OF ALASKA / Alaska State Troopers	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PAWS,353 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:		**Direction from Accident Site:**	59°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.37 inches Hg	**Temperature/Dew Point:**	-11°C / -17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Wasilla, AK	**Type of Flight Plan Filed:**	Company VFR
Destination:	Beluga, AK	**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:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	61.528057,-149.688049(est)

Administrative Information

Investigator In Charge (IIC):	Banning, David
Additional Participating Persons:	James Holden; Federal Aviation Administration; Anchorage, AK Mike Inman; Alaska State Troopers; Anchorage, AK
Original Publish Date:	May 2, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90679

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.

Aviation Investigation Final Report

Location:	Wasilla, Alaska	**Accident Number:**	ANC15FA009
Date & Time:	January 31, 2015, 13:05 Local	**Registration:**	N78NR
Aircraft:	Piper PA18	**Aircraft Damage:**	Substantial
Defining Event:	Midair collision	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

One commercial pilot was operating a Piper PA-18 "Super Cub" wheel/ski-equipped airplane as a cross-country public flight, and another commercial pilot was operating a Piper PA-18 "Super Cub" ski-equipped airplane as cross-country private flight in day, visual meteorological conditions. Multiple witnesses reported observing one of the airplanes (the wheel/ski-equipped airplane) traveling in a southwesterly direction and the other airplane traveling in a northwesterly direction. One witness said that, as the airplanes approached each other and converged, neither airplane changed altitude nor direction and that they subsequently collided at an approximate 90-degree angle. An examination of both airplanes revealed impact signatures consistent with each airplane colliding at an approximate 90-degree right angle, consistent with the witness's statement. After the collision, both aircraft descended uncontrolled into an area of densely populated trees and sustained substantial damage, and both pilot sustained serious injuries.

The pilot of the southwesterly bound airplane reported that, while in level cruise flight, the sun was at his 1130- to 1200-o'clock position; this likely resulted in sun glare. He added that he saw a momentary flash in the upper left corner of his windscreen, which was instantaneously followed by the collision. After the collision, his airplane entered an uncontrollable dive with no elevator control. In a final effort to regain control, he pushed the control stick forward, and he was able to regain limited elevator authority, but the airplane continued to descend, nose low, into the tree-covered terrain.

Probable Cause and Findings

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

Both pilots' inadequate visual lookout and failure to see and avoid each other while in level cruise flight, which resulted in a midair collision. Contributing to the accident was the obscuration of the other pilot's visibility due to sun glare.

Findings

Personnel issues	Monitoring other aircraft - Pilot
Personnel issues	Monitoring other aircraft - Pilot of other aircraft
Environmental issues	Glare - Effect on personnel

Factual Information

History of Flight

Enroute	Midair collision

HISTORY OF FLIGHT

On January 31, 2015, about 1305 Alaska standard time, a wheel/ski-equipped Piper PA-18 airplane, N82735, and a ski-equipped Piper PA-18 airplane, N78NR, collided midair near South Hollywood Airport, about 5 miles southwest of Wasilla, Alaska. N82735 was operated by the State of Alaska Department of Public Safety, Alaska State Troopers, Anchorage, Alaska as a visual flight rules (VFR) cross-country public-use flight, under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91, when the accident occurred. N78NR was registered to and operated by the pilot as a VFR cross-country flight under the provisions of Title 14 CFR Part 91. The sole occupants of the airplanes, both certificated commercial pilots, sustained serious injuries. After the collision, both aircraft descended uncontrolled into an area of densely populated birch and spruce trees and sustained substantial damage. Visual meteorological conditions prevailed in the area at the time of the accident. N82735 departed Wasilla Airport about 1300 bound for Beluga, Alaska, and company flight following procedures were in effect. N78NR departed Birchwood Airport, Chugiak, Alaska about 1250 destined for an off-airport landing site near Johnson Creek with no flight plan on file.

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According to records provided by the State of Alaska Department of Public Safety, he had logged about 543 hours of flight experience at the time of the accident. He also passed a currency checkride on September 04, 2014.

N78NR pilot:

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The cockpit area was extensively damaged. The engine and firewall were displaced upward and aft, and the instrument panel was displaced upward. The throttle was found in the near closed position. The mixture was full rich, and the carburetor heat was in the off position.

The exhaust tube had malleable bending and folding, producing sharp creases that were not cracked or broken along the creases.

The airplane's left wing separated near its fuselage attach points, exhibited extensive impact damage, and came to rest underneath and intertwined with the outboard portion of N78NR right wing. The wing strut remained attached to its respective wing and fuselage attach points, but was found embedded in the internal structure of N78NR right wing.

The airplane's severed right wing exhibited extensive impact damage, and came to rest inverted and parallel to the fuselage.

Both the left and right aileron remained attached to their respective attach points, but exhibited extensive spanwise accordion style crushing.

The left horizontal stabilizer and elevator remained attached to their respective attach points and were relatively undamaged. The right horizontal stabilizer exhibited extensive leading edge crushing along the entire span of the stabilizer. The right elevator exhibited spanwise bending from the tip inboard. The vertical stabilizer and rudder remained attached to their respective attach points, but exhibited extensive impact damage.

Both propeller blades remained attached to the engine crankshaft. One propeller blade exhibited leading edge gouging, substantial torsional "S" twisting and chordwise scratching. The other propeller blade exhibited slight torsional "S" twisting and chordwise scratching, with the propeller tip separating from the blade.

All the primary flight control surfaces were identified at the accident site, and flight control continuity was verified from all of the primary flight control surfaces to the cockpit.

The examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

N78NR:

All of the airplanes major components were found at the main wreckage site, with the exception of a large outboard portion of the airplanes right wing, which was located underneath and intertwined with the main wreckage on N82735.

The on-scene examination revealed that the airplane impacted in a near vertical attitude and came to rest inverted, in an area of densely populated spruce and birch trees, at an elevation of about 355 feet MSL. The nose of the airplane was on about a 240 degree heading.

The cockpit area was extensively damaged. The engine and firewall were displaced upward and to the left, and the instrument panel was displaced to the right. The throttle control separated from the cockpit and was found in the near-closed position.

The airplane's left wing remained attached to its respective attach points, but exhibited leading edge crushing and spanwise upward bending from about midspan outboard to the tip.

The airplanes right wing separated from the fuselage, and fragmented into two major sections. The inboard section came to rest about 97 feet from the main wreckage. The outboard section was located underneath and intertwined with the left wing from N82735. The right forward wing strut separated about nine inches from the wing attach point. A section of the right forward wing strut, about 21 inches long, was located near the wreckage. Examination of these separations revealed flat angular fractures with red paint transfer marks.

Both the left and right aileron remained attached to their respective attach points, but sustained impact damage.

The tail section separated from the empennage just forward of the vertical stabilizer and was severely fractured.

Both propeller blades remained attached to the engine crankshaft. One propeller blade was relatively undamaged. The other propeller blade exhibited aft bending that initiated about six inches from the propeller hub.

All the primary flight control surfaces were identified at the accident site, with the exception of the right aileron that was located at the accident site of N82735. Control continuity could not be established due to numerous fractures in the system, but all fractures exhibited features consistent with tension overload.

The examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

N82735

The FAA Civil Aeromedical Institute performed toxicology examinations for the pilot on March 02, 2015, which was negative for alcohol and drugs.

N78NR

The FAA Civil Aeromedical Institute performed toxicology examinations for the pilot on April 9, 2015, which was negative for ethanol. The examination revealed the presence of the following agents in the blood, and urine:

Etomidate detected in Serum

Ketamine detected in Blood

Etomidate is a short-acting intravenous anesthetic agent commonly used by first responders for the induction of general anesthesia and sedation.

Ketamine is an anesthetic agent and is commonly used as a dissociative sedative in emergency medicine.

SURVIVAL ASPECTS

N82735

At the time of the accident, the pilot of N82735 was utilizing a 4 point safety harness. The harness remained secure throughout the impact sequence and was cut by first responders during the extrication of the pilot.

In addition, the pilot was wearing a standard police issued Kevlar protective vest and a David Clark Series K10 helmet. Pieces of the fractured helmet were found in the cockpit area during the wreckage examination.

An Artex ME406 emergency locator transmitter (ELT) was located in the mounting cradle secured by approved Velcro® strapping. The cradle remained attached to the airframe and the antenna remained attached to both the fuselage and ELT device. Due to witnesses in the area at the time of the accident, the ELT did not aid in the search and rescue operation. When first responders arrived at the accident site, the ELT was transmitting.

N78NR

N78NR was equipped with a 4 point safety harness. It is unknown if it was in use at the time of the accident.

A 121.5 Mhz ELT was installed in the aircraft and activated during the impact sequence. As a result of the rapid response time by witnesses, the ELT did not aid in the search and rescue operation.

TESTS AND RESEARCH

Global Positioning System (GPS)

N78NR

At the time of the accident, the pilot was using a Garmin GPS 176 series portable GPS receiver, capable of storing route-of-flight data. The unit was sent to the NTSB's Vehicle Recorders Division for examination.

A NTSB electrical engineer was able to extract the GPS data for the accident flight, which included, in part, time, latitude, longitude, and GPS altitude. Groundspeed and course information were derived from the extracted parameters.

The GPS data logs for January 31, 2015, revealed the accident flight departed Birchwood Airport about 1250. After departure, the airplane proceeded northeast, before it turned northwest proceeding around the ocean waters of Knik Arm. Just prior to the collision, the airplane had climbed to a GPS altitude of

1,648 feet, and was continuing in a northwesterly direction at a groundspeed of 90 knots. The data log did not reveal an abrupt change in course or altitude prior to the collision.

A flight track map overlay, and tabular data corresponding to the accident flight are available in the public docket for this accident.

Lights

N82735

The left and right wingtip strobe assemblies were removed from the airplane and sent to the NTSB Materials Laboratory for further examination. Examination of the strobe lights revealed that the conductor within the flashtube was intact and appeared to be undamaged; the laboratory was unable to determine whether the strobe was activated or illuminated at the time of the accident.

N78NR

In addition to the aforementioned tests/inspections, the landing light, taxi light and left navigation light were removed from N78NR and inspected to determine if there had been any filament stretch at the moment of impact (indicating the light may have been illuminated). All three bulbs were sent to the NTSB Materials Laboratory for further examination. None of the bulbs showed any clear indication of filament stretch or filament contact with the inside of the glass bulb surface.

Pilot Information

Certificate:	Commercial	**Age:**	52,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	March 7, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1400 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N78NR
Model/Series:	PA18 150	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18-3513
Landing Gear Type:	Tailwheel; Ski	**Seats:**	1
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	1499 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	
Registered Owner:	JEFF B. BARA	**Rated Power:**	
Operator:	JEFF B. BARA	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PAWS,353 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:		**Direction from Accident Site:**	59°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.37 inches Hg	**Temperature/Dew Point:**	-11°C / -17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Chugiak, AK (PABV)	**Type of Flight Plan Filed:**	None
Destination:	Skwentna, AK	**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:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	61.528057,-149.688049(est)

Administrative Information

Investigator In Charge (IIC):	Banning, David
Additional Participating Persons:	James Holden; Federal Aviation Administration; Anchorage, AK Mike Inman; Alaska State Troopers; Anchorage, AK
Original Publish Date:	May 2, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90679

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.