# Aviation Investigation Final Report

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| **Location:** | Sitka, Alaska | **Accident Number:** | ANC08FA104 |
| **Date & Time:** | August 10, 2008, 21:40 Local | **Registration:** | N98HA |
| **Aircraft:** | Beech 95-B55 | **Aircraft Damage:** | Substantial |
| **Defining Event:** | Fuel exhaustion | **Injuries:** | 2 Fatal |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

The private pilot departed on an instrument-flight-rules (IFR), cross-country flight after obtaining fuel. The next planned fuel stop was about 741.5 nautical miles away. IFR weather conditions prevailed along the flight, but visual conditions existed at the next airport, where the pilot landed in order to obtain fuel. The pilot subsequently departed and contacted an Air Route Traffic Control Center (ARTCC) specialist to say that he was unable to refuel at that airport. He then requested a clearance to another airport, about 83.4 nautical miles away, and stated: “I hope we have enough fuel.” The ARTCC specialist offered a closer airport that was about 36 miles east. The pilot requested a clearance for the Localizer-Type Directional Aid (LDA) approach to the closer airport. During the initial stages of the approach, the pilot appeared to be unsure about the LDA approach procedures, and was unable to join the localizer for the approach. The ARTCC specialist asked the pilot if he wanted to try another approach, and the pilot said that he wanted to continue on to the airport that was 83.4 miles away instead. About 1 hour after the airplane had departed in search of additional fuel, and about 2 minutes before the accident, the ARTCC specialist contacted the pilot to request an estimate of his remaining fuel. The pilot’s last garbled radio transmission was: "Looks like we're having trouble with our left engine." A U.S. Coast Guard helicopter located the airplane's wreckage in an area of mountainous, tree-covered terrain along the anticipated flight route. A responding state trooper reported that the airplane's fuel tanks were empty. Fuel consumption calculations disclosed that the estimated fuel remaining when the airplane arrived at the destination airport (where fuel was not available) was equivalent to about 1 hour and 11 minutes flight time at a cruise power setting. No mechanical problems with the airplane were discovered during postaccident inspections by the NTSB.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power in flight due to fuel exhaustion resulting from the pilot's inadequate fuel planning and navigation.

## Findings

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| **Environmental issues** | Tree(s) - Contributed to outcome |
| **Aircraft** | Fuel - Fluid level |
| **Personnel issues** | Fuel planning - Pilot |

# Factual Information

## History of Flight

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| **Enroute-cruise** | Fuel exhaustion (Defining event) |
| **Emergency descent** | Collision with terr/obj (non-CFIT) |

HISTORY OF FLIGHT

On August 10, 2008, about 2140 Alaska daylight time, a twin-engine Beech 95-B55 airplane, N98HA, sustained substantial damage during an emergency landing in mountainous, tree-covered terrain, about 28 miles north of Sitka, Alaska. The airplane was being operated as an instrument flight rules (IFR) cross-country personal flight under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91, when the accident occurred. The private pilot and the sole passenger were killed. Visual meteorological conditions prevailed at Sitka, and an IFR flight plan was filed. The accident flight originated at the Gustavus Airport, Gustavus, Alaska, about 2045.

During a review of the accident airplane's instrument flight rules (IFR) flight plan, the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) discovered that before arriving in Gustavus, the flight had departed Bellingham, Washington, about 1639 pacific daylight time (1539 Alaska daylight time). The purpose of the stop in Gustavus was to purchase fuel before continuing to Skagway, Alaska, the flight's destination for that day.

On August 11, about 0800, the NTSB IIC reviewed the air traffic control radio communication recordings maintained by the Federal Aviation Administration (FAA). The recordings revealed that about 2005 the pilot contacted the Anchorage Air Route Traffic Control Center (ARTCC) specialist on duty, and reported that he was about 14 miles southeast of Gustavus, at 6,000 feet msl. The pilot requested the GPS "Y" approach to runway 29 at Gustavus, and his request was granted. About 2020, the pilot contacted the ARTCC specialist to report that he had landed at Gustavus, and that he wanted to cancel his IFR flight plan.

About 2051, the pilot again contacted the ARTCC specialist to report that he had departed the Gustavus Airport, and said, in part: "Yeah, uh, we went into Gustavus but, uh, there [was] no one there, all the things are locked, and we thought we would make a quick run to Sitka. We're going to Sisters now; I hope we have enough fuel." When the ARTCC specialist asked the pilot how much fuel he had remaining, and he reported that he had "about an hour." The Sitka Airport is about 83 miles south-southeast of Gustavus.

About 2055, the ARTCC specialist asked the pilot if he would like an approach to the Juneau Airport, which is about 36 miles east of the Gustavus Airport. The pilot responded by saying: "…uhhh, umm, I don't think so, uh…we haven't done one, but I think Sitka would probably be ok,

wouldn't it?" The ARTCC specialist said, in part: "…at the time Juneau weather is better than Sitka." The pilot responded and requested an approach to the Juneau Airport. The ARTCC specialist then asked the pilot what his altitude was, and at the same time instructed him to maintain VFR weather conditions. The pilot responded by saying: "We're at 6,500 and we're pretty well socked in." The ARTCC specialist then said, in part:"…climb and maintain 10,000 [feet], and can you maintain VFR through 10,000 [feet]?" The pilot said, in part: "…I don't know (unintelligible) maintain VFR at 10,000 [feet], and (unintelligible)."

About 2056, the ARTCC specialist said, in part: "N98HA, are you sure you don't want to return to Gustavus with the weather like it is?" The pilot responded by saying: "I told you there's no one there at Gustavus, the place is locked, and we can't go, no phone, nothing."

As the flight neared Juneau, while operating in instrument meteorological conditions (IMC), the ARTCC specialist issued the pilot a clearance for the Localizer-Type Directional Aid (LDA) approach to Runway 08. However, during the initial stages of the approach, the pilot appeared to be unsure about the LDA approach procedures, and he was unable to join the localizer for Runway 08. The ARTCC specialist instructed the pilot to discontinue the approach, and climb the airplane. The ARTCC specialist then asked the pilot if he wanted to try another approach to Juneau, return to Gustavus, or continue to Sitka. The pilot said, in part: "No, why don't we just go to Sitka." The ARTCC specialist then said: "N98HA, the weather is worse at Sitka, and you will have to shoot an LDA approach, can you do that? The pilot said: "At Sitka? Yeah, we ought to be able to do that." The ARTCC specialist then issued the pilot an IFR clearance to Sitka.

About 2113, the ARTCC specialist asked the pilot how much fuel he had remaining, and how many people were on board the airplane. The pilot said, in part: "Ok, there's two on board, and about an hour and ten minutes of fuel left."

About 2124, the pilot contacted the ARTCC specialist and asked: "…these LDA's are just like an ILS, isn't it?" The ARTCC specialist responded by saying, in part: "…affirmative, it just doesn't have a glide slope."

As the flight neared Sitka, about 2137, the ARTCC specialist attempted to contact the pilot to request a better estimate of his remaining fuel, and initially there was no response. About 2138, the pilot's garbled response was: "Looks like we're having trouble with our left engine." No further communications were received from the accident airplane, and the airplane did not arrive at Sitka. The airplane was officially reported overdue at 2202.

After being notified of an overdue airplane, and after learning about reports of an emergency locator transmitter (ELT) signal along the accident pilot's anticipated flight route, search and rescue personnel from the U.S. Coast Guard Air Station Sitka, began a search for the missing airplane. About 2330, the crew of a U.S. Coast Guard helicopter located the airplane's wreckage in an area of mountainous, tree-covered terrain. A rescue swimmer was lowered to the accident site, and confirmed that the airplane's occupants were dead.

The accident occurred during the hours of sunset, which began at 2052. Civil twilight for Sitka ended at 2139, or 1 minute before the accident occurred.

During a telephone conversation with the NTSB IIC on August 11, a pilot-rated Alaska State Trooper that was dispatched to the accident site reported that when he arrived on scene the airplane's fuel tanks were empty, and there was no smell of fuel around the accident site.

According to a family member of the pilot, the accident airplane departed from Marietta, Georgia on August 9, en route to Alaska. The family member said that the purpose of the trip was to travel to various sites throughout Alaska, over a 3 week time period. Documents recovered from inside the accident airplane, including fuel receipts and the pilot's written itinerary, revealed that the route of flight, after departing from Marietta, was Great Bend, Kansas; Cheyenne, Wyoming; Boise, Idaho, then Bellingham, Washington.

## PERSONNEL INFORMATION

The pilot held a private pilot certificate with airplane single engine land, airplane single engine sea, instrument airplane, glider, and multiengine land ratings. His most recent third-class medical certificate was issued January 14, 2008, which contained the limitations that he must wear corrective lenses, and it would not be valid after December 31, 2008.

During a telephone conversation with the NTSB IIC on August 13, a representative from the Federal Aviation Administration (FAA) regional flight surgeon's office, Alaska Region, reported that the accident pilot's third-class medical certificate, issued on January 14, 2008, had been denied by the FAA's Aeromedical Certification Division, Oklahoma City, Oklahoma, effective February 21, 2008, due to a history of coronary heart disease.

A review of the FAA's airmen records on file in the Airman and Medical Records Center in Oklahoma City revealed that on February 21, 2008, the FAA sent the pilot a certified letter, stating in part, that he did "not meet the medical standards … because of your history of coronary heart disease that has required treatment (percutaneous transluminal coronary angioplasty/intracoronary stent placement). … We have further considered your eligibility for a special issue medical certificate … and have been unable to find you qualified due to your history of atrial fibrillation with excessive pauses for aeromedical certification purposes."

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 FAA's airmen records on file in the Airman and Medical Records Center in Oklahoma City. On the pilot's application for medical certificate, dated January 14, 2008, he indicated that his total aeronautical experience consisted of 7,500 flight hours, of which 105 were logged during the previous 6 months.

## AIRCRAFT INFORMATION

At the time of the accident the airplane had a total time in service of 3,617.0 flight hours. A

review of the maintenance records revealed that the most recent annual inspection of the airframe and engine was on November 1, 2007, about 40 hours before the accident.

The airplane was equipped with two Teledyne Continental Motors IO-470-L21-B engines, each rated at 230 horsepower. Both engines were overhauled on February 20, 1997, about 1,028 hours before the accident.

## METEOROLOGICAL INFORMATION

The closest official weather observation station was Sitka, 28 miles south-southeast of the accident site. On August 10, at 2153, an Aviation Routine Weather Report (METAR) was reporting, in part: Wind 090 degrees at 4 knots; visibility, 10 statute miles; clouds and sky condition, 2,500 feet overcast; temperature, 55 degrees F; dew point, 50 degrees F; altimeter, 30.01 inHg.

The winds aloft forecast along the accident airplane's route of flight, between 1300 and 2200 on August 10, was reporting, in part:

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| Seattle, Washington | 9,000 feet: 280 degrees (true) at 21 knots |
| | 12,000 feet: 280 degrees (true) at 23 knots |
| Annette Island, Alaska | 9,000 feet: Light and variable |
| | 12,000 feet: 260 degrees (true) at 13 knots |
| Juneau, Alaska | 9,000 feet: 220 degrees (true) at 12 knots |
| | 12,000 feet: 220 degrees (true) at 8 knots |

## WRECKAGE AND IMPACT INFORMATION

On August 11, about 1145, an Alaska State Trooper, along with four members from the Sitka Mountain Rescue Group traveled to the accident site. At the request of the NTSB IIC, the State Trooper photo documented the accident site before any recovery efforts began.

All of the airplane's major components were located at the main wreckage site. The wreckage was in an area of heavily-wooded, dense, old growth timber. The average heights of the trees around the accident site were in excess of 100 feet.

The initial crash path was marked by broken treetops on a southerly heading. The initial impact point on the ground was discernible by an area of disturbed tundra, with broken and toppled tree limbs.

At its point of rest, the nose of the airplane was facing the base of a large Sitka spruce tree.

The bark had been stripped in patches from about 25 feet above the ground to the base, and branches of the tree were broken about 20 feet above the ground. Trees immediately next to the point of rest had broken branches about 40 feet above the ground.

The wings remained attached to the airplane's fuselage, but were displaced forward of their normal position. Each wing had extensive spanwise leading edge aft crushing, with tree bark imbedded within the impact areas. The wing's flight control surfaces remained connected to their respective attach points.

The airplane's main landing gear was in the retracted position.

The fuselage, aft of the cockpit, was crushed forward, and the empennage was bent up, and slightly to the left. The left horizontal stabilizer and elevator was torn from its fuselage mounting attach points, but was found adjacent to the main wreckage. The right stabilizer and elevator, vertical stabilizer, and rudder remained attached to the empennage, but all received impact damage.

The cockpit area was extensively damaged. The nose of the airplane was displaced aft and upward, and the instrument panel was crushed forward and upward.

The Alaska State Trooper reported that when he arrived on scene, the airplane's left fuel tank was empty. He noted that the airplane's left wing fuel tank/bladder appeared to be intact and not breached. The Trooper said that the airplane's right wing rubber fuel bladder had been torn open during the impact, but there was no smell of fuel around the right wing.

On December 4, 2008, following recovery of the airplane's wreckage to Sitka, a wreckage examination and layout was done under the direction of the NTSB IIC. Also present was an air safety investigator from Hawker Beechcraft Corporation, and an aviation safety inspector from the FAA.

Both fuel selectors were found in the on position. The left tank fuel selector handle sustained impact damage, and the right selector handle was not damaged.

Due to impact damage, the flight controls could not be moved by their respective control mechanisms, but continuity of all primary and secondary flight control cables (including the flap flexible drive cables) were confirmed from the cockpit to their respective control surface.

The propeller assemblies remained connected to the engine crankshafts, and both sustained relatively minor damage.

No evidence of any preimpact engine or airframe anomalies were discovered during the NTSB inspection.

MEDICAL AND PATHOLOGICAL INFORMATION

On August 13, 2008, a postmortem examination of the pilot was done under the authority of the Alaska State Medical Examiner, 4500 South Boniface Parkway, Anchorage, Alaska. The examination revealed that the cause of death for the pilot was attributed to multiple blunt force injuries.

The FAA's Civil Aeromedical Institute (CAMI) did a toxicological examination on September 22, 2008, which was negative for alcohol. The toxicological examination revealed unspecified levels of Amlodipine and Warfarin in the pilot's blood, and unspecified levels of the same substances in his urine.

Amlodipine is a prescription medication commonly used to treat high blood pressure and angina (chest pain), and Warfarin is a anticoagulation medication commonly used to prevent heart attacks, strokes, and blood clots in veins, arteries and lungs.

The NTSB's medical officer reviewed the pilot's autopsy report, revealing that the pilot's enlarged heart weighed 690 grams. The report also noted, in part: "… coronary arteries all show moderate focal atherosclerotic changes."

The autopsy report also noted, on examination of the pilot's central nervous system, that "There are 3 to 4 focal old left basal ganglia lacunae, the largest measuring between 1/8 and 3/l6 inch in greatest dimension." According to the NTSB medical officer, the presence of basal ganglia lacunae is consistent in patients that have had several previous small strokes, though the time at which the strokes occurred, or the severity of any symptoms that might have resulted, could not be determined.

TESTS AND RESEARCH

During a telephone conversation with the NTSB IIC on September 12, the manager of the local fuel vender at the Bellingham International Airport reported that on Sunday, August 10, the accident pilot purchased 66.5 gallons of fuel using the company's self serve fuel pump system. The manager said that the pilot did not talk with any of the employees, and he used his credit card to purchase the fuel at the pump.

Fuel consumption calculations were provided by the airplane manufacturer and reviewed by the NTSB IIC. According to the calculations, at a cruise engine power setting, the airplane's total fuel consumption rate was approximately 24.2 gallons per hour. The airplane's maximum usable fuel capacity was 136 gallons, with an estimated maximum endurance time of 5 hours and 12 minutes.

After departing from Bellingham, the airplane's estimated total flight time to Gustavus was 4 hours and 41 minutes. The straight line distance between Bellingham and Gustavus, without any maneuvering turns, is about 741.5 nautical miles.

According to the airplane manufacturer, the estimated fuel that was remaining when the airplane arrived in Gustavus was about 28.5 gallons, equivalent to about 1 hour and 11 minutes of remaining endurance (time before fuel exhaustion) if the engines were operated at a cruise power setting. The manufacturer noted the fuel remaining calculations were based on forecasted winds and temperatures aloft, and assumed that the pilot followed the proper fuel leaning techniques during the flight. Also, additional fuel would have been consumed at Gustavus while starting the engines, taxiing prior to departure, and during the climb to cruise altitude from Gustavus, further reducing the endurance time.

The straight line distance between Gustavus and Sitka is about 83.4 nautical miles.

As noted, the pilot contacted the ARTCC specialist at 2051 to report that he had already departed from the Gustavus Airport. At 2138, approximately 1 hour after the airplane's estimated departure time from Gustavus, the pilot reported to the ARTCC specialist that he was having trouble with the left engine.

On December 1, 2008, the engines were examined externally at an engine maintenance and overhaul facility in Anchorage, under the direction of the NTSB IIC. Also present was an air safety investigator from Teledyne Continental Motors (TCM). No preimpact mechanical anomalies were discovered during the engine examinations. A wooden "club" test propeller was installed on each engine, and the engines were placed on an engine test cell. The left engine was started and produced full power. The right engine started, but the impact damaged propeller crankshaft flange prevented a full power engine run.

WRECKAGE RELEASE

The Safety Board released the wreckage, located at the accident site, to the owner's insurance representative on August 13, 2008. The Safety Board retained the engines until December 1, 2008, when they were also released to the owner's insurance representative.

## Pilot Information

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| **Certificate:** | Private | **Age:** | 82,Male |
| **Airplane Rating(s):** | Single-engine land; Single-engine sea; Multi-engine land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | Glider | **Restraint Used:** | |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | Yes |
| **Medical Certification:** | Class 3 None | **Last FAA Medical Exam:** | January 14, 2008 |
| **Occupational Pilot:** | No | **Last Flight Review or Equivalent:** | January 9, 2007 |
| **Flight Time:** | 7500 hours (Total, all aircraft), 105 hours (Last 90 days, all aircraft), 6 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Beech | **Registration:** | N98HA |
| **Model/Series:** | 95-B55 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | TC-2111 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 6 |
| **Date/Type of Last Inspection:** | November 1, 2007 Annual | **Certified Max Gross Wt.:** | 5100 lbs |
| **Time Since Last Inspection:** | 93 Hrs | **Engines:** | 2 Reciprocating |
| **Airframe Total Time:** | 3617 Hrs at time of accident | **Engine Manufacturer:** | Continental |
| **ELT:** | C91 installed, activated, aided in locating accident | **Engine Model/Series:** | IO-470-L |
| **Registered Owner:** | MARKETING DIMENSIONS INTERNATIONAL | **Rated Power:** | 230 Horsepower |
| **Operator:** | Harold J. Gaines | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Night |
| **Observation Facility, Elevation:** | SIT,21 ft msl | **Distance from Accident Site:** | 28 Nautical Miles |
| **Observation Time:** | 20:53 Local | **Direction from Accident Site:** | 340° |
| **Lowest Cloud Condition:** | | **Visibility** | 10 miles |
| **Lowest Ceiling:** | Overcast / 2700 ft AGL | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 4 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 90° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.01 inches Hg | **Temperature/Dew Point:** | 13°C / 10°C |
| **Precipitation and Obscuration:** | | | |
| **Departure Point:** | Gustavus, AK (GST ) | **Type of Flight Plan Filed:** | IFR |
| **Destination:** | Sitka, AK (SIT ) | **Type of Clearance:** | IFR |
| **Departure Time:** | 20:45 Local | **Type of Airspace:** | |

## Airport Information

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| **Airport:** | Sitka Airport SIT | **Runway Surface Type:** | |
| **Airport Elevation:** | 21 ft msl | **Runway Surface Condition:** | |
| **Runway Used:** | | **IFR Approach:** | None |
| **Runway Length/Width:** | | **VFR Approach/Landing:** | Forced landing |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 Fatal | **Aircraft Damage:** | Substantial |
| **Passenger Injuries:** | 1 Fatal | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 2 Fatal | **Latitude, Longitude:** | 57.656112,-135.330551 |

## Administrative Information

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| **Investigator In Charge (IIC):** | Johnson, Clinton |
| **Additional Participating Persons:** | Mick Green; Federal Aviation Administration (Operations); Juneau, AK<br>Sara Irwin; Teledyne Continental Motors (TCM) ; Mobile, AL<br>Ernest Hall; Hawker Beechcraft; Wichita, KS |
| **Original Publish Date:** | September 10, 2009 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | The NTSB traveled to the scene of this accident. |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=68694 |