National Transportation Safety Board
Washington, DC 20594

Brief of Accident

Adopted 05/06/2009

SEA08FA062

File No. 25123 | 01/14/2008 | Lihue, HI | Aircraft Reg No. N410UB | Time (Local): 05:08 HST

Make/Model:	Hawker Beechcraft Corporation / 1900C
Engine Make/Model:	Pratt And Whitney / PT6A-65B
Aircraft Damage:	Destroyed
Number of Engines:	2
Operating Certificate(s):	On-demand Air Taxi
Name of Carrier:	Alpine Aviation Inc.
Type of Flight Operation:	Non-scheduled; Domestic; Mail
Reg. Flight Conducted Under:	Part 135: Air Taxi & Commuter

	Fatal	Serious	Minor/None
Crew	1	0	0
Pass	0	0	0

Last Depart. Point:	Honolulu, HI
Destination:	Lihue, HI
Airport Proximity:	Off Airport/Airstrip

Condition of Light:	Night/Dark
Weather Info Src:	Weather Observation Facility
Basic Weather:	Visual Conditions
Lowest Ceiling:	5500 Ft. AGL, Overcast
Visibility:	10.00 SM
Wind Dir/Speed:	030 / 023 Kts
Temperature (°C):	20
Precip/Obscuration:	No Obscuration; No Precipitation

Pilot-in-Command Age: 38

Certificate(s)/Rating(s)

Airline Transport; Flight Instructor; Commercial; Multi-engine Land; Single-engine Land

Instrument Ratings

Airplane

Flight Time (Hours)

Total All Aircraft:	3098
Last 90 Days:	110
Total Make/Model:	1480
Total Instrument Time:	UnK/Nr

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HISTORY OF THE FLIGHT

On January 14, 2008, at 0508 Hawaiian standard time, N410UB, a Hawker Beechcraft Corporation 1900C, was lost from radar over the ocean about 6.5 nautical miles south of the Lihue Airport, Lihue, Hawaii, located on the island of Kauai. Alpine Aviation Inc., doing business as Alpine Air, was operating the airplane as an on-demand cargo flight, AIP 253, under the provisions of 14 Code of Federal Regulations (CFR) Part 135. The airline transport pilot, who was not located, is presumed to have been killed, and the airplane was destroyed. Night visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan had been filed. The flight departed Honolulu International Airport, Honolulu, Hawaii, on the island of Oahu, at 0443, and was destined for Lihue.

According to the operator, the pilot was making his first flight after coming off of a rest period. The purpose of the flight was to transfer mail to Lihue, with a return flight to Honolulu later that same day. The flight was scheduled to arrive at Lihue about 0515.

A Safety Board air traffic control specialist reviewed the air traffic control information surrounding the accident flight. The pilot contacted the Honolulu Control Facility (HCF) controller at 0443:23, and was later advised to climb to 10,000 feet mean sea level (msl). The pilot was then advised to contact approach. At 0449:08, the pilot contacted approach and advised that the airplane was climbing to 10,000 feet msl. At 0453:50, the flight crew of Aloha Airlines (AAH) 917 contacted the HCF controller and advised that they were climbing to 12,000 feet msl, and they could see the Beech 1900. They were advised to maintain visual separation with the Beech 1900, and cleared to proceed direct to Lihue.

At 0454:24, the AAH 917 flight crew requested to level off at 14,000 feet. About 4 minutes later, AIP 253 was instructed to descend at pilot discretion and maintain 2,000 feet. The controller verified that the pilot had Lihue weather, and provided him with the current altimeter setting. A few seconds later, the controller advised AIP 253 that he had traffic overtaking him and that he should expect a visual approach to follow the traffic.

At 0459:50, the HCF controller began providing the relieving controller a position relief briefing. After the relieving controller advised he had no questions about the briefing, the controller being relieved transferred control of the position. At 0501:08, the HCF controller instructed AIP 253 to maintain 6,000 feet, and the pilot acknowledged.

About 6 seconds later, the controller asked AAH 917 if they still had visual contact with AIP 253 and the AAH 917 crew indicated, "Yes, sir, he's, ah, no factor." AAH 917 was then cleared to 2,000 feet msl and told to maintain visual separation with AIP 253. At 0502:39, the HCF controller advised the AAH 917 crew to report the field in sight. The flight crew replied that they had visual contact with the airport. The HCF controller then cleared AAH 917 for a visual approach into Lihue airport, terminated radar services, and instructed the flight crew to change to the advisory frequency and report on the ground.

At 0503:30, the HCF controller instructed AIP 253 to, "Follow the Boeing 737, cleared visual approach to Lihue airport. Radar service terminated. Change to advisory frequency approved and report on the ground please." A few seconds later, the pilot replied, "OK, we'll follow him in visual approach and, ah, we're switching (unreadable). So long."

At 0506:53, the HCF sector 2 (R2) controller called the sector 3 (R3) controller stating that he was monitoring the sector frequency and was ready to receive a position briefing in order to separate the two sectors. The R3 controller indicated that there were two visual approaches at Lihue.

At 0507:26, according to radar data, the minimum safe altitude warning (MSAW) aural and visual alarms activated on AIP 253 on the R3 controller's radar display for 32 seconds. The controller was not in contact with the pilot when the warning occurred, so the pilot was not advised of the MSAW alert. Thirteen seconds later, AAH 917 canceled the need for radar service inbound to Lihue. At 0507:58, AIP 253 was lost from radar about 6.5 miles south-southeast of the airport, and the radar data showed an altitude of minus 100 feet mean sea level. At 0515:17 and 0518:06, the R2 controller attempted to reestablish contact with the pilot, but was unsuccessful.

The AAH 917 flight crew submitted a written statement. The captain reported that during the flight from Honolulu to Lihue, they were advised of an airplane overhead at 10,000 feet. They called the traffic "in sight" and were given a direct clearance to Lihue. They continued their climb to 14,000 feet and maintained visual separation with the other airplane. They accelerated to cruise speed, and were given a clearance to 10,000 feet. They were able to maintain visual separation with the other airplane as they passed it about the 3 o'clock position and a few miles laterally. They were approximately 40 miles from the Lihue airport when they were given a clearance to descend to 2,000 feet. They visually identified the airport approximately 25 miles from their current position and were given a visual approach to Lihue. Air traffic control advised them to contact the common traffic advisory frequency and they made position reports prior to landing. During their approach to landing, they heard Alpine Air come on the frequency and communicate his position from Lihue as, "15 southeast of the airport." The first officer later heard a position report from Alpine Air reporting, "...about 7 miles from the airport." There was no distress call on the frequency, nor was there any indication that there was a problem.

When they contacted air traffic control for departure, the captain said, "They asked us to look for a Beechcraft on the ground because they were still waiting for a cancellation from the aircraft." The captain reported that they saw an aircraft that appeared to be a Beechcraft on the ramp in the distance.

One of the assistant chief pilots for Alpine Air-Hawaii submitted a written statement. At 0623, the assistant chief pilot was notified that the airplane had not arrived in Lihue. He was about 8 minutes from landing at Honolulu and contacted HCF to ask about the whereabouts of the airplane. The HCF controller advised him that the flight plan had been canceled at 0515. After the assistant chief pilot landed, he confirmed with the Lihue ground crew that the airplane was not on the ground. He then contacted HCF and advised them that the airplane had not arrived at Lihue. HCF then reported that the AAH 917 flight crew had confirmed that the airplane was on the ground so the clearance was canceled, but that they did not receive a cancellation directly from the accident pilot. The assistant chief pilot then advised HCF to contact the Coast Guard and Lihue fire rescue.

The Coast Guard indicated that debris from an airplane was initially identified floating on the ocean surface at 0848, approximately 11 miles south-southwest of the airport. The water depths in the search area were up to 800 fathoms (4,800 feet). Additional debris was identified and collected and then transported to the Coast Guard station at Lihue. The Coast Guard discontinued the search on the afternoon of January 15.

PERSONNEL INFORMATION

Pilot Information

The pilot, age 38, held an airline transport pilot certificate for multi-engine land issued on November 4, 2006, and was issued a type rating in the Beech 1900 on October 12, 2007. The pilot also held a type rating for a Bombardier CL-65 with second-in-command privileges. In addition, the pilot held a flight instructor certificate for single-engine land. The pilot held a first-class airman medical certificate issued on January 7, 2008, with no limitations. On the medical application, the pilot reported 3,000 hours total pilot time, with 300 hours accrued during the past 6 months.

72-Hour History

According to those who had spent time with the pilot over the 72 hours leading up to the accident, nothing appeared unusual in the pilot's daily activities. On Friday, January 11, he completed a flight at 0650, and spent the day sleeping and relaxing. He went surfing and had dinner with his family. The pilot then flew four flights. He began these flights on January 12 at 0145, and then had a rest period in Lihue from 0425 until his next scheduled flight at 1725.

The following morning the pilot slept until about 1300, and then went to the beach with his girlfriend. They ate about 1600 and then were sleeping about 1800. The pilot left for work earlier than normal on Sunday night because he had to make an extra stop on his way to the airport. The pilot contacted his girlfriend at 1230 and told her that the flight would be delayed due to the lack of mail, and that he was going to sleep until his next flight.

Alpine personnel working the morning of the accident flight reported that the pilot arrived to the office about midnight. He appeared to be in good spirits and alert. The pilot's first flight to Lihue had been canceled due to a low volume of mail. The pilot slept for approximately 2 hours before getting ready for the accident flight.

AIRPLANE INFORMATION

The airplane, a Hawker Beechcraft Corporation 1900C, was manufactured in 1989. According to the airplane's Federal Aviation Administration (FAA) Aircraft Airworthiness file, it was powered by two Pratt and Whitney PT6A-65B engines equipped with Hartzell HC-B4MP propellers. Review of copies of maintenance logbook records showed a routine inspection was completed on November 11, 2007, at a total airframe time of 19,123.9 hours. The last available

Aircraft Flight and Maintenance Log entry dated January 12, 2008, showed that the airplane had accrued 19,194.9 hours.

The airplane was not equipped with a ground proximity warning system, and altitude was monitored using the altimeter. Company pilots also reported using the precision approach path indicator (PAPI) and instrument landing system (ILS) glide slope for guidance when flying into Lihue.

The load manifest for the flight was not located. Using the previous flight's load manifest sheet, investigators calculated an estimate loading for the accident flight. On January 12, the airplane's last flight prior to the accident flight, the airplane departed Lihue with 1,800 pounds of fuel. The flight from Lihue to Honolulu would have consumed about 600 pounds of fuel. Fueling records from Honolulu showed that the airplane was fueled with 1,150 pounds of fuel on January 14, for a total of 2,350 pounds. According to the USPS, the airplane was carrying 4,186 pounds of mail. Using the crew weight previously entered by the pilot, the ramp weight of the airplane was 16,098 pounds, with a takeoff weight of 15,988 pounds. The landing weight would have been about 15,388 pounds.

WRECKAGE AND IMPACT INFORMATION

Pieces of the wreckage were recovered by the Coast Guard and brought to a secure storage facility. An FAA inspector examined the wreckage initially, and then a Safety Board investigator performed a follow up examination. These pieces included the front cabin door, the rear cargo door, various personnel effects of the pilot, a life raft, approximately half of the mail (in weight) that was being transported, and one of the landing gear. Multiple smaller pieces were also recovered. In June, two fiberglass pieces of the wreckage were identified on the shore of Niihau. In November, landing gear presumed to be from the accident airplane washed ashore on the island of Kauai.

METEOROLOGICAL INFORMATION

The following weather conditions were reported at Lihue Airport at 0453: wind from 030 degrees at 23 knots with gusts to 27 knots, 10 miles visibility, cloud layers scattered at 4,100 feet and overcast at 5,500 feet, temperature 20 degrees Celsius, dew point 13 degrees Celsius, and the altimeter setting was 30.13 inches of Mercury.

A Surface Analysis chart prepared by the National Weather Service (NWS) National Centers for Environmental Prediction (NCEP) for 1400 January 13 and 0200 January 14 showed a cold front moving through the islands and a northerly-northeasterly low-level air flow behind the front.

The Kauai Weather Surveillance Radar-1988, Doppler (PHKI WSR-88D), which was located about 13 nautical miles from the accident location, showed reflectivity returns. The radar beam center at the lowest scan (0.5-degree) in vicinity of the accident location was at approximately 1,100 feet msl. In addition, the maximum reflectivity near the accident location was approximately 20 decibels of Z (dBZ).

AIRPORT INFORMATION

An Airport Duty Operations Controller was conducting an airport inspection while the accident airplane was approaching the airport. He recalled that he heard a pilot who identified himself as Alpine Air state that he was, "...landing 35 and 7 miles out." Airport personnel reported that the runway lights, medium intensity approach lighting system with runway alignment indicator lights (MALSR), and PAPI lights for runway 35, were functional at the time of the accident.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

Alpine Air has been operating since 1975, and is based in Provo, Utah. They operate cargo routes in Montana, North Dakota, South Dakota, Hawaii, and Washington. Alpine Air has been operating in Hawaii since April of 2004. Their Hawaiian base is located at Honolulu International Airport where they employ 14 pilots, 10 maintenance personnel, 1 office manager, and 1 station manager. At the time of the accident, the Hawaii operations included four Beech 1900C airplanes, and four Beech 99 airplanes.

The Hawaii base consists of two Assistant Chief Pilots and a shop manager. The two Assistant Chief Pilots, report directly to the operations manager (Chief Pilot) located in Provo, who visits the Hawaii base two times per year. The shop manager reports directly to the Director of Maintenance in Provo, who visits the Hawaii base three times a year. In addition, the General Manager for Alpine Air visits the Hawaii base every other month. All pilot ground training is conducted in Provo, and all flight checks and check rides are performed at the Hawaii base.

According to the General Operations Manual for Alpine, "When an aircraft is overdue and unreported and there is reason to believe that the aircraft is in distress or has been involved in an accident, accident notification procedures will be followed."

The Salt Lake City Federal Aviation Administration Flight Standards District Office (FSDO) provides oversight for Alpine Air. The Honolulu FSDO had assigned a Geographic Operations Inspector (GOI) who retired in September of 2007. According to Alpine Air, a new GOI had not been assigned.

ADDITIONAL INFORMATION

Human Performance Observational Study

A Safety Board human performance investigator traveled from Honolulu International Airport to Lihue Airport to document the nighttime visual cues as seen from several airborne fixes located near the ground track of the accident airplane. The observation was conducted during dark, night visual meteorological conditions. The human performance investigator occupied a cockpit jump seat on an airplane during the observation.

During the observation flight, very low levels of celestial illumination were observed. The ocean was completely dark. The lights on the island were grouped into two distinct areas during the approach into the airport: a bright area northeast of the Ha'upu Range (to the right) and a fainter area southwest of the Ha'upu Range (to the left). No other lights were visible and all of the unlit terrain was completely dark. As the airplane flew from the NAPUA fix toward MORKE, and then onto AKULE, a very faint patch of illumination was visible a few thousand feet above the coastline. However, the only real external visual cues were the two lighted areas on either side of the flight crews' forward field of view. These areas provided some outside visual indication of changes in bank while flying toward the mountain range, but the lack of any other external visual cues, and the absence of a discernible horizon make it impossible to determine, with certainty, whether the airplane was level or descending without looking at the flight instruments. As the airplane intercepted the localizer for the runway 35 instrument landing system (ILS) approach, the airplane headed toward the bright area of lights northeast of the Ha'upu Range, with the fainter area of lights southwest of the mountains no longer visible in the pilots' forward field of view.

Airplane Performance Study

A Safety Board vehicle performance engineer completed a performance study for the accident flight. The calculated accident flight ground track was overlaid on a map image, compared to the ground track data from previous flights accomplished by the accident pilot, and annotated with air traffic control events. The ground speed and rate of climb values derived from the radar data from each flight were plotted. Radar data, wind data, estimated airplane configuration (flaps, weight, center of gravity) were used with Beechcraft 1900C aerodynamic and thrust data to estimate the airplane's roll, pitch, and heading angles required to match the accident flight trajectory. The simplified integrated flight path results indicate that the accident flight trajectory could have been flown using calibrated airspeeds ranging from about 170 to 260 knots, small angles of attack, pitch angles between plus 3 degrees and minus 7 degrees, bank angles

between plus or minus 20 degrees, small angles of sideslip, and engine power within expected boundaries.

Air Traffic Control Information

FAA Order 7110.65, paragraph 5-4-22, Visual Approach, states, "A visual approach is conducted on an IFR flight plan and authorizes a pilot to proceed visually and clear of clouds to the airport. Either the pilot must have the airport or the preceding identified aircraft in site. This approach must be authorized and controlled by the appropriate ATC control facility. Reported weather at the airport must have a ceiling at or above 1,000 feet and visibility 3 miles or greater. Visual approaches are an IFR procedure conducted under IFR in visual meteorological conditions. Cloud clearance requirements of 14 CFR 91.155 are not applicable, unless required by operation specification. When visually following a preceding aircraft, acceptance of the visual approach clearance constitutes acceptance of pilot responsibility for maintaining a safe approach interval and adequate wake turbulence separation." In addition, it states, "Authorization to conduct a visual approach is an IFR authorization and does not alter IFR flight plan cancellation responsibility."

According to the Aeronautical Information Manual, "Canceling IFR Flight Plan," paragraph 5-1-14 states, in part, "If operating on an IFR flight plan to an airport where there is no functioning control tower, the pilot must initiate cancellation of the IFR flight plan. This can be done after landing if there is a functioning FSS [flight service station] or other means of direct communications with ATC."

FAA Order 7110.65, section 3, paragraph 10-3-1, states the following:
a. Consider an aircraft to be overdue, initiate the procedures stated in this section, and issue an ALNOT [Alert Notice] when neither communications nor radar contact can be established and 30 minutes have passed since:
NOTE- the procedures in this section also apply to an aircraft referred to as "missing" or "unreported."
1. Its ETA [estimated time of arrival] over a specified or compulsory reporting point or at a clearance limit in your area.
2. Its clearance void time.

b. If you have reason to believe that an aircraft is overdue prior to 30 minutes, take appropriate action immediately.
c. The Center in whose area the aircraft is first unreported or overdue will make these determinations and takes any subsequent action required.

Alpine Air Training Manual

The Alpine Air Training Manual provided the following information, in part, to pilots:

"Night flight operations are an integral part of Part 135 operations. Unfortunately, statistics prove that the possibility of an aviation accident is much higher during night time than during the day. Additionally, it has been proven that an accident is many more times likely on a moonless night than on a moonlit night. Some of the reasons for this increase in accidents are; (1) Differences in night vision as opposed to day vision, (2) Lack of outside visual cues, (3) increased probability of inadvertent encounters with hazardous weather conditions, (4) visual illusions, etc."

"At night it becomes possible to see lights from a great distance, this could cause a false sense of security that can result in the pilot beginning a descent to the intended airport too early. If the pilot has not reviewed, or is unfamiliar with the terrain features around that airport the result could be disastrous. However, being able to see lights at great distances does have advantages also. Beside the ability to locate the airport from many miles out, it can also be easier to see other aircraft, but care must be taken to realize that at times the aircraft position lights can blend into the stars or the lights of a city below, making detection very difficult."

"Spatial disorientation occurs when the brain receives conflicting messages from the sensory organs, which results in the pilot's inability to correctly determine

the position, attitude, or motion of the aircraft in relation to the earth's surface. This is of extreme importance to pilots, considering that studies have shown that spatial disorientation is the leading physiological cause of fatal aircraft accidents, and is suspected to be involved in almost 1/3 of all fatal aircraft accidents. Therefore, it behooves pilots to understand the cause and corrective action of spatial disorientation."

"The brain tries to determine the body's orientation to the earth's surface through input from three main senses: (1) vision, (2) vestibular and, (3) kinesthetic. As can be seen, when the visual sense is reduced or lost, the other senses are ineffective in properly determining orientation."

Sun and Moon Data

According to the US Naval Observatory Astronomical Applications Department, on Monday, January 14, the beginning of civil twilight was at 0655, and sunrise was at 0719. On January 13, the moon was a waxing crescent and 29 percent of its visible disk was illuminated.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows.
The pilot's spatial disorientation and loss of situational awareness. Contributing to the accident were the dark night and the task requirements of simultaneously monitoring the cockpit instruments and the other airplane.