



National Transportation Safety Board Aviation Accident Final Report

Location:	BIGFORK, MT	Accident Number:	SEA98FA101
Date & Time:	04/11/1998, 0221 MDT	Registration:	N9247W
Aircraft:	Piper PA-46-350P	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

The aircraft disappeared from ATC radar immediately after being cleared to descend from 12,000 feet to 10,000 feet. ATC radar data showed the aircraft at 11,900 to 12,000 feet for approximately the last 6 minutes prior to the disappearance, with the last Mode C altitude and discrete transponder code 2402 (at 0221:03) reported as 11,800 feet. The last three returns, 12,000, 11,900, and 11,800, are consistent with the start of a descent from 12,000 feet. Due to construction at the radar antenna site, the area where the aircraft disappeared was blocked from radar coverage. Subsequent attempts by the controller to contact the aircraft were unsuccessful. A 7,000- to 7,500-foot overcast was reported at the destination, along with lower clouds and precipitation. Documentation at the accident site indicated an approximate level flight path from the broken treetops to the area of ground impact into a northwest-facing 60-degree mountain slope at approximately the 5,600-foot level. The wreckage was not located for approximately two months. Post-accident examinations of the aircraft's Bendix/King KEA-130A (United Instruments 5035PB-P57) encoding altimeter revealed needle impressions on the indicator face and pointers consistent with an altitude indication of 12,620 feet. The internal components of the unit were severely damaged and a functional test was not possible. The aircraft was equipped with a copilot's altimeter. Only the faceplate was recovered and examined. One impression on the main faceplate revealed a needle impression by the 100-foot pointer consistent with 560 feet. The position of the 1,000-foot pointer could not be determined. The pilot's 4-day activity history showed that he was returning from a demanding 3-day work assignment, that his recent sleeping schedule was irregular, and that he had been awake about 20 hours at the time of the accident. There was no evidence found of a mechanical failure or malfunction at the time of the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain terrain clearance for undetermined reasons. Contributing factors were the mountainous terrain, trees, dark night conditions, clouds and pilot fatigue.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: UNKNOWN

Findings

1. (C) CLEARANCE - NOT MAINTAINED
2. (F) TERRAIN CONDITION - MOUNTAINOUS/HILLY
3. (F) OBJECT - TREE(S)
4. (F) WEATHER CONDITION - CLOUDS
5. (F) LIGHT CONDITION - DARK NIGHT
6. (F) FATIGUE - PILOT IN COMMAND

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

Findings

7. (F) WEATHER CONDITION - CLOUDS
8. (F) LIGHT CONDITION - NIGHT
9. (C) PROPER ALTITUDE - NOT IDENTIFIED - PILOT IN COMMAND
10. (F) FATIGUE - PILOT IN COMMAND
11. (F) TERRAIN CONDITION - MOUNTAINOUS/HILLY

Factual Information

This report was modified on December 3, 2004.

HISTORY OF FLIGHT

On April 11, 1998, at 0221 mountain daylight time (MDT), a Piper PA-46-350P Malibu Mirage airplane, N9247W, registered to CMSystems, Inc., of Polson, Montana, and being flown by an airline transport pilot (who held commercial pilot privileges for single-engine land airplanes), disappeared from radar 20 nautical miles east-southeast of Glacier Park International Airport, Kalispell, Montana. Visual meteorological conditions were reported at Glacier Park International at 0156, and an instrument flight rules (IFR) flight plan from Bismarck, North Dakota, to Glacier Park International was in effect. The business flight was operated under 14 CFR 91 and had departed Madison, Wisconsin, at 1945 central daylight time (CDT) on the evening of April 10, making an intermediate fuel stop at Bismarck. The aircraft wreckage was located on June 16, 1998 in the Swan mountain range approximately 10 nautical miles east-northeast of Bigfork, Montana. The aircraft was destroyed, and the pilot and sole passenger were found to have sustained fatal injuries.

Federal Aviation Administration personnel reported that at the time of the accident, the radar site located in Lakeside, Kalispell, Montana, was under construction to upgrade the facility from an ARSR-3 system to an ARSR-4 system. Due to this construction at the site, the reception of radar signal was inhibited to the northeast of the facility site. The Salt Lake City ARTCC radar tracked the aircraft, which was assigned a transponder code of 2402. The flight path indicated that the aircraft approached this area of blocked radar coverage from the north at an altitude of 11,900 feet then was dropped as it entered the area of blocked radar coverage at 0221:03. One additional secondary return was noted at 0221:14, with a code of 2002, at 11,800 feet.

According to FAA ATC records, the pilot's filed route of flight from Bismarck to Glacier Park International was from Bismarck to the Havre, Montana (HVR), VOR 160 degree radial/34 DME fix, thence direct to Glacier Park International. N9247W was cleared for takeoff from Bismarck at 2358 CDT on April 10, and was cleared to an altitude of 10,000 feet after takeoff. The aircraft was subsequently instructed to climb to 12,000 feet for terrain by Salt Lake City Air Route Traffic Control Center (ARTCC) at 0155 MDT on April 11, approximately 26 minutes prior to loss of contact with the aircraft.

Approximately 0213, the pilot was asked by a Salt Lake City ARTCC controller which approach he wanted into Glacier Park International, and the pilot replied that he wanted to plan the VOR approach to Glacier Park International runway 30 "for now." At 0217, the Salt Lake ARTCC controller cleared the aircraft to join the Kalispell VOR 15 DME arc from the east and arc south, and told the pilot to expect the approach in about 10 miles. At 0220:57, Salt Lake ARTCC cleared the pilot to descend from 12,000 to 10,000 feet. The pilot's acknowledgement of the descent clearance at 0221:00 was the last radio transmission received from the accident aircraft. At 0223:41, the Salt Lake ARTCC controller advised N9247W that radar contact was lost and asked which radial from the Kalispell VOR the aircraft was crossing, without response. Subsequent attempts by the Salt Lake ARTCC controller to reestablish contact with the accident aircraft were unsuccessful.

The Salt Lake ARTCC radar depicted the aircraft's track during the last 6 minutes of radar

contact as being generally westbound directly toward Glacier Park International, approximately on the filed route of flight at 11,900 to 12,000 feet, then turning onto a southbound track at a point approximately 14 nautical miles from the Kalispell VOR/DME. The aircraft then tracked generally southbound toward the Kalispell 093 degree radial/15 DME fix (an initial approach fix for the VOR runway 30 approach), reporting its Mode C altitude as 11,900 feet, for about 8 nautical miles before loss of radar contact. The southbound portion of the aircraft's track was not on the 15 DME arc, but was up to approximately 3 miles inside the arc. The aircraft's average ground speed between the last two air traffic control (ATC) radar plots was computed to be 191 knots (normal cruise true airspeed at 12,000 feet is 190 knots, according to a performance chart in the PA-46-350P pilot's operating handbook.) The aircraft's last radar position, as recorded by Salt Lake ARTCC, was at 0221:03, at the Kalispell 087 degree radial/14 DME fix, at a Mode C-reported altitude of 11,900 feet. According to air traffic control (ATC) communications records furnished by the FAA, there were no reports of difficulty by the pilot to ATC prior to the disappearance, nor did the pilot report canceling IFR.

Following the last Salt Lake ARTCC radar contact with the aircraft, a military radar site near Malmstrom Air Force Base (AFB), Great Falls, Montana, recorded a series of 11 primary radar returns in the accident area from 0222:19 to 0226:43. The Malmstrom AFB primary radar returns in this area were recorded in an azimuth sector between 285.3 and 286.6 degrees true from the site, at slant ranges between 107.2 and 109.0 nautical miles.

The accident occurred at 48 degrees 6.1 minutes North and 113 degrees 50.9 minutes West.

PERSONNEL INFORMATION

The accident pilot, who was 48 years old at the time of the accident, was the owner of CMSystems (a company which produced software for the airline and banking industries, and which owned the accident aircraft) and was also the president of Security State Bank and Trust, a Polson, Montana, bank founded by the pilot's grandfather. He was a resident of Aurora, Colorado, and (according to interviews conducted by NTSB human performance investigators) visited Polson for approximately one week each month to conduct bank business. He held an airline transport pilot (ATP) certificate with a date of issue of December 16, 1983. His ATP certificate carried airplane multiengine land and Boeing 727 type ratings, and commercial pilot privileges for single-engine land airplanes. The pilot had also previously held a flight instructor certificate with airplane single engine, airplane multiengine, and airplane instrument ratings. His flight instructor certificate was issued on August 17, 1982, and expired on August 31, 1984. Additionally, the pilot held a ground instructor certificate with advanced and instrument ratings, with a date of issue of October 8, 1975. According to the pilot's wife, the pilot worked as a pilot for Frontier Airlines from 1978 to 1986, and also flew for 2 years for Continental Airlines before beginning his own software development company.

The accident pilot's logbooks were not recovered by the NTSB. According to information provided to the NTSB by AIG Aviation, Inc. of Northglenn, Colorado, the pilot's total flight time as of June 24, 1997, was 11,450 hours, including 920 hours in the PA-46, and the pilot had flown 59.2 hours between January 12, 1998, and the accident date. AIG Aviation furnished documentation to the NTSB which indicated that the pilot had satisfactorily completed type-specific flight and ground training on the PA-46-350P through Aviation Sales Inc. of Englewood, Colorado. This training, completed on June 21, 1997, included an FAA biennial

flight review and instrument competency check. It could not be established whether or not the pilot met 14 CFR 61.57 recency-of-experience requirements for night or IFR flight at the time of the accident.

The pilot held a FAA third-class medical certificate dated June 27, 1997. The pilot's medical certificate carried a restriction requiring the wear of corrective lenses.

The passenger, an employee of Security State Bank and Trust who worked on bookkeeping and computer operations, was not a pilot, and was reported by a witness to have been observed to be seated in the back of the airplane when it departed Bismarck.

AIRCRAFT INFORMATION

The accident aircraft, a Piper PA-46-350P Malibu Mirage (serial number 4622168), was issued a standard airworthiness certificate on August 25, 1994. The aircraft's last annual inspection was on October 3, 1997, at 691.5 hours tachometer time. The last entry in the airframe logbook, indicating compliance with Piper Service Bulletin 1014 and dated March 25, 1998, indicated that the aircraft's hour meter read 781.1 hours at that time.

According to the Piper equipment list for the aircraft, at the time of delivery the aircraft was equipped with autopilot/flight director, area navigation (RNAV), pilot's horizontal situation indicator (HSI), copilot's pitot/static system (per Piper drawing 82233-7) and flight instruments, radar, Bendix/King KLN 90A global positioning system (GPS), Bendix/King KAS 297B altitude selector, and dual vacuum pumps. (NOTE: The KLN 90A GPS is FAA-approved as class A2 GPS equipment under FAA Technical Standard Order [TSO] C129a. According to TSO C129a, class A2 equipment provides IFR en route and terminal navigation capability, but is not FAA-approved for use on instrument approaches.) The aircraft was also equipped for flight into known icing conditions. The aircraft logbook further indicated that the aircraft had been modified on September 21, 1994, by installation of an Eventide model Argus 5000 moving map display, and on February 3, 1996, by installation of a Terra TRA-3000/Tri-40 radar altimeter system. The aircraft log indicated that both of these installations were performed by Denver Avionics, Inc. of Denver, Colorado, per FAA field approvals. According to information obtained from the manufacturers of the units, the TRA-3000/Tri-40 radar altimeter system provides altitude above ground level (AGL) information from 40 to 2,500 feet AGL, and the Argus 5000 moving map display installed in the accident aircraft (part number 5000-10-15, serial number 003353) did not have the capability to display aircraft altitude.

According to Piper's equipment list for the aircraft, the aircraft was delivered with a Bendix/King KEA-130A encoding altimeter (Honeywell [formerly AlliedSignal] part number 066-03064-0005, serial number 3661), an optional installation which replaced the standard encoding altimeter for use with the KAS 297B altitude selector. This altimeter was supplied to the manufacturer, Honeywell, by United Instruments of Wichita, Kansas, and was sold by Honeywell under the Bendix/King name. United Instruments manufactures the altimeter as a model 5035PB-P57; the United Instruments serial number on the altimeter installed in the accident aircraft was 25981. According to information supplied by Honeywell, the KEA-130A altimeter installed in the accident aircraft was manufactured in October 1993. The aircraft log indicated that the second altimeter installed in the accident aircraft was a part number "5934PAD-3" (the manufacturer was not given.) According to the aircraft log, and job records furnished by Denver Avionics (Job Order #20459, dated September 5, 1996), the aircraft's altimeters were noted to be out of tolerance specifications during the aircraft's last altimeter

and pitot/static system check. A -50 foot adjustment was made to the encoding altimeter, and a -40 foot adjustment made to the second altimeter, to bring them within tolerance specifications. Both altimeters were subsequently tested and certified to 30,000 feet, on September 5, 1996. The aircraft static system was tested and certified to 30,000 feet on September 6, 1996.

Engineering drawings supplied by The New Piper Aircraft indicated that on the accident aircraft, the pitot/static system was constructed such that the pilot's airspeed indicator and the pilot's altimeter were supplied with static air from separate static lines, both of which "T" off of the static air line to the copilot's instruments. A diagram of the aircraft pitot/static system from the PA-46-350P Pilot's Operating Handbook (POH) is attached to this report.

According to information supplied by Honeywell, the KEA-130A encoding altimeter furnishes altitude and barometric correction information to the KAS 297B altitude selector, and also supplies the KLN 90A GPS with "gray code" altitude information.

METEOROLOGICAL INFORMATION

Information supplied to the FAA by GTE Government Systems of Chantilly, Virginia, indicated that the pilot of N9247W received a computer preflight weather briefing via the GTE Direct User Terminal Access System (DUATS) approximately 1649 Central daylight time on April 10, 1998. Records of the briefing indicated that the pilot was furnished with AIRMET Sierra Update 4, issued at 1345 MDT on April 10 and valid until 2000 MDT on April 10, during that briefing. AIRMET Sierra Update 4 advised that mountains in western Montana would occasionally be obscured in clouds and precipitation, and that these conditions would continue beyond 2000 MDT through 0200 MDT on April 11.

The area forecast for the western third of Montana valid until 0200 MDT on April 10, given in the DUATS briefing, was for scattered to broken clouds at 9,000 to 10,000 feet, broken clouds at 14,000 feet, cloud tops at flight level 180, and widely scattered rain showers. The area forecast gave an outlook of visual flight rules conditions for the time period from 0200 MDT to 0800 MDT.

Cloud cover and visibility information in the Terminal Aerodrome Forecast (TAF) for Glacier Park International for the time period 0200 MDT to 0800 MDT, as given in the DUATS briefing, was: prevailing visibility 6 statute miles; scattered clouds at 2,000 feet; ceiling 4,500 feet overcast; with 40% probability during that time period of 4 statute miles visibility in light rain and snow showers and ceiling 1,500 feet broken.

An updated AIRMET meteorological advisory issued at 0145 MDT on April 11 (approximately 36 minutes before contact was lost with N9247W), AIRMET Sierra Update 1, advised that mountains in western Montana would occasionally be obscured in clouds and precipitation during the time frame in which contact with N9247W was lost.

The 0156 automated METAR observation at Glacier Park International Airport (approximately 21 nautical miles west-northwest of the accident site; elevation 2,972 feet above sea level) reported wind from 010 degrees at 3 knots; visibility 10 statute miles; light rain; few clouds at 300 feet; scattered clouds at 3,400 feet; ceiling 7,000 feet overcast; temperature 4 degrees C; dewpoint 3 degrees C; altimeter setting 29.72 inches Hg; and that rain began at 2 minutes past the hour.

The 0256 automated Glacier Park International Airport METAR observation reported calm

winds; visibility 9 statute miles; ceiling 6,000 feet broken; overcast at 7,500 feet; temperature and dewpoint 3 degrees; altimeter setting 29.68 inches Hg; rain ended at 0159; and pressure falling rapidly.

Astronomical data calculation indicated 100% moon illumination (a full moon) at the latitude and longitude of the accident site at the time contact with the aircraft was lost.

Local officials reported that the mountains in which the crash occurred were covered with snow at the time of the disappearance.

AIDS TO NAVIGATION

The FAA conducted a special flight inspection of the Kalispell VOR/DME facility on July 27, 1998, with satisfactory results. Segments checked during this flight inspection included the 15 nautical mile (NM) arc from the 093 degree radial clockwise to the 145 degree radial, the 148 degree radial of the VOR from 12.0 NM inbound to the VOR, and the 316 degree radial of the VOR from the VOR out to 8.0 NM.

AERODROME AND GROUND FACILITIES

The Kalispell runway 30 VOR approach incorporates an initial approach fix (IAF) at the Kalispell VOR/DME 093 degree radial/15-mile distance measuring equipment (DME) fix. The approach procedure specifies that from this IAF, the Kalispell 15-DME arc is flown to the southwest at an altitude of 8,600 feet to the Kalispell 148 degree radial. A right turn to an inbound course of 328 degrees is then made to the VOR/DME, which is the final approach fix (FAF). Once established on the 148 degree radial inbound, a descent to a stepdown altitude of 7,500 feet is made; this altitude is maintained until 10 miles from the VOR/DME, at which point a descent to the FAF crossing altitude of 5,500 feet is made.

FLIGHT RECORDERS

The accident airplane was not equipped, nor was it required to be equipped, with a cockpit voice recorder or flight data recorder.

WRECKAGE

A preliminary survey of the aircraft wreckage was conducted at the accident site on June 17, 1998. The aircraft wreckage was located approximately 3 1/4 nautical miles south of the aircraft's last recorded Salt Lake ARTCC radar position, with the top of the wreckage area at the 5,600-foot level on a 7,500-foot mountain. The aircraft had impacted a generally northwest-facing, 60-degree slope. The hazardous terrain conditions at the accident site precluded a detailed on-site examination by investigators. The largest pieces of wreckage were observed to be within approximately 70 feet laterally, and 75 feet down slope from the top of the wreckage area, which was marked by a ground and tree scar area of a size and shape generally resembling a frontal silhouette of a Piper PA-46 aircraft. However, numerous small pieces extended several hundred feet down slope from the top of the wreckage area. The "frontal silhouette" ground/tree scar at the top of the wreckage area was oriented in approximately an upright, "wings level" attitude on the mountainside. The aircraft's engine was found to be buried into the earth at the approximate center of this ground/tree scar area, underneath fragmented airframe wreckage. Freshly broken and damaged trees were observed, with the broken tree tops approximately level with the ground/tree scar at the top of the wreckage area. An azimuth of 120 degrees magnetic was measured from the broken trees to the center of the ground/tree scar at the top of the wreckage area.

The major wreckage components, as observed during the preliminary wreckage survey, were: fragmented airframe wreckage with engine underneath, located at the center of the airplane-shaped ground/tree scar area; the right wing, suspended in trees located approximately 70 feet laterally (southwest) from the airplane-shaped ground/tree scar area; and a ball of wreckage including the aircraft's vertical tail, located at the base of a broken tree approximately 75 feet down slope from the airplane-shaped ground/tree scar area.

An encoding altimeter was found by a ground party which reached the accident site, and was photographed at the site with the 10,000-foot pointer at approximately the 10,000-foot position, the 1,000-foot pointer between the 2,000-foot and 3,000-foot position, and the 100-foot pointer at approximately the 600-foot position.

MEDICAL AND PATHOLOGICAL INFORMATION

Insufficient remains of either aircraft occupant were recovered to perform autopsies or toxicological testing. The certificates of death issued for both occupants by the Flathead County, Montana, Coroner gave the cause of death for both aircraft occupants as multi-system trauma due to (or as a consequence of) a single-engine airplane crash.

An Albuterol metered inhalation device with the accident pilot's name on it was found by investigators in personal effects recovered from the aircraft wreckage. According to commercially available medical and drug reference sources consulted by the NTSB IIC, Albuterol, a prescription adrenergic bronchodilator, is "a Sympathomimetic [a drug that has the effect of stimulating the sympathetic nervous system] used to treat congestion, allergic reactions, and asthma (bronchial)." (PharmAssist[™] CD-ROM, SoftKey International Inc., 1993.) On his June 27, 1997, FAA medical certificate application, the pilot indicated he had no history of asthma, lung disease, hay fever, or allergy. The pilot's personal medical records, which were subsequently obtained by the NTSB, disclosed that the pilot had a history of severe allergy to cats dating to at least 1991 and a history of exercise-induced asthma dating to November 1996, although the November 1996 record entry pertaining to this condition indicated: "...He does not have any flare-ups usually. It only occurs when he exercises." The pilot's wife, in an interview with a NTSB human performance investigator, also reported that the pilot used an asthma inhaler, having developed an exercise-induced asthma. The FAA Guide for Aviation Medical Examiners, September 1996 revision (current at the time of the accident), states: "A history of mild or seasonal asthmatic symptoms is not disqualifying if the applicant otherwise meets the medical standards and currently requires no treatment...."

SURVIVAL ASPECTS

Following loss of contact with the accident aircraft, a search for the aircraft was initiated. The search was coordinated by the Montana Aeronautics Division and involved air and ground search assets from the Division, the U.S. Air Force, the Civil Air Patrol, the Flathead County Sheriff's Office, and Minuteman Aviation of Kalispell, Montana. According to a Montana Aeronautics Division official, the search concentrated primarily in and around the vicinity of the aircraft's last known position. The Montana Aeronautics Division official reported that poor weather, including 6 to 8 inches of new snow in the mountains, hampered initial search efforts. A full-scale search for the aircraft was conducted until April 22, 1998, after which time the search was continued on a limited basis. The aircraft wreckage was located on June 16, 1998, by a privately contracted search pilot hired by the occupants' families.

TESTS AND RESEARCH

The aircraft wreckage was recovered from the accident site and transported to the facilities of Discount Aircraft Salvage, Deer Park, Washington, where it was reconstructed and examined by investigators on June 29, 1998. Major parts of the aircraft wreckage noted at the reconstruction included the following: fuselage forward section with wing forward and aft carry-through spar sections attached; both propeller blades; the left wing (in two sections) with aileron and flap (in two sections); the aft cabin with cabin entry door section, rudder, and left horizontal stabilizer section attached; three detached sections of elevator with one section of elevator trim tab; the right horizontal stabilizer (detached from the airframe); right wing in a single section; and engine.

Damage observed to the wreckage during the June 29, 1998, examination was as follows. The carry-through spar sections attached to the forward fuselage section displayed severe accordion/telescoping type damage. Both of the propeller blades exhibited "S" bending, and one blade was also torsionally twisted. The leading edge of the left wing displayed accordion-type damage. The left wing was broken approximately 5 feet outboard of a 2-foot dent at midspan. The top of the aft cabin section was splayed open. In the aft cabin/empennage section, no evidence of missing or disconnected flight control cables prior to impact was found, and no damage at the rudder bell crank stop bolts was observed. The static ports on both sides of the aft fuselage section were unobstructed, with the static lines detached. Balance weight sections from both sides of the elevator were observed. The right flap, detached from the right wing, was in two sections. The right aileron remained attached to the right wing. The right aileron control rod was broken, but the aileron control cables moved the broken control rod properly. A mark was observed in the throat of the fuel injection servo, in a position near the full closed position of the servo butterfly valve.

During the June 29, 1998 wreckage examination, most instruments and controls, to include the battery switch and both alternator switches, were found to be destroyed, with the following exceptions. Both airspeed indicators were found, with one indicator reading approximately 60 knots indicated airspeed (KIAS) and the other reading approximately 210 KIAS. (NOTE: The indicator reading 60 KIAS was subsequently identified by serial number as the copilot's airspeed indicator, and the indicator reading 210 KIAS was subsequently identified by serial number as the pilot's airspeed indicator.) The encoding altimeter was located, and was captured at an indication of approximately 12,620 feet, with the altimeter set to 29.70 inches Hg. A vacuum gauge was found indicating 0 inches Hg. An attitude indicator was found, and was heavily damaged but the indicating components were captured in a position corresponding to approximately straight-and-level. The flap handle was found to be up. The throttle quadrant was found, with the throttle in a position near closed, the propeller control in midrange, and the mixture control near full rich.

The aircraft's Bendix/King KEA-130A encoding altimeter was taken to manufacturer Honeywell (at that time, AlliedSignal) for examination under the supervision of an inspector from the FAA Kansas City, Missouri, Flight Standards District Office (FSDO). During this examination, which took place on December 3, 1998, investigators again noted that the unit's altitude display indicated approximately 12,600 feet, with the altimeter being set to 29.70 inches Hg. An attempt was made to disassemble the unit in order to examine its internal components. However, when the altimeter assembly was removed from its housing, several broken parts were found inside, and the encoder assembly was found to be destroyed. Honeywell's examination notes indicated that "damage to [the internal altimeter] components is so severe that it was not possible to determine if any pre-crash damage or malfunction

existed."

The accident pilot's father forwarded a box of components to Discount Aircraft Salvage on August 26, 1998, which he stated had been recovered from the accident site by a Kalispell, Montana, business owner (the search pilot hired by the occupant's families) during a trip to the accident site on July 8, 1998, and subsequently turned over to him. After the items arrived at Discount Aircraft Salvage, the NTSB investigator-in-charge (IIC) requested that an inspector from the FAA Spokane, Washington, FSDO examine the contents of the box in order to determine what was in the box. The Spokane FSDO inspector found a damaged altimeter face included among the contents of the box. This altimeter face was sent to the NTSB Materials Laboratory, Washington, D.C., for a microscopic examination. The Materials Laboratory reported that their examination of this altimeter face (Materials Laboratory Factual Report (Errata) Report No. 99-15A, May 17, 2002, attached) disclosed that a needle impression whose size, shape, and approximate radial location corresponded to the intermediate needle (100-foot pointer). The position of the impression coincided with the last three digits of the altitude reading 560 feet at the time of impact. The face also contained two marks that resembled a "V" impression. These marks were found on the main face of the indicator adjacent to the impression corresponding to the intermediate needle, between the large numbers "5" and "6" and appeared similar to the tip of a needle. Closer inspection of the "V" impression revealed that the marks did not intersect each other and the radial location of the impression was beyond the diameter of the smaller diameter plate. The smaller diameter plate was not provided for examination; therefore no determination could be made for the location of the 1,000-foot needle.

The autopilot control panel from the accident aircraft was sent to the NTSB Materials Laboratory in order to examine the filaments of the annunciator lights within the panel. Lights from the AP, TRIM, BC, APR, NAV, GS, HDG, ALT, FD, and YD annunciator positions were examined. The Materials Laboratory reported that their examination disclosed no evidence of hot stretching of any of the filament pieces from any of the bulbs, although the glass envelopes for the bulbs from the AP, HDG, FD, and YD positions were missing with only small portions of the filaments from those bulbs remaining (Materials Laboratory Factual Report No. 99-44, December 23, 1998, attached.)

The dial face and indicator needles from the KEA-130A encoding altimeter were sent to the NTSB Materials Laboratory for microscopic examination. The Materials Laboratory reported that their examination of the encoding altimeter face (Materials Laboratory Factual Report No. 99-81, February 26, 1999, attached) disclosed needle impressions by the 100-foot pointer and 10,000-foot pointer onto the dial face, and needle impressions by the 100-foot pointer and 1,000-foot pointer onto the 10,000-foot pointer, such that when all pointers were aligned over their respective impression marks, the altimeter indicated an altitude of about 12,620 feet (approximately 7,000 feet higher than the elevation of the top of the wreckage area as recorded by investigators at the accident site.)

The aircraft wreckage was reexamined by investigators from the NTSB and The New Piper Aircraft at Discount Aircraft Salvage on May 4, 1999. During the reexamination, investigators attempted to trace the static system lines in the vicinity of the instrument panel in order to check for static line blockages. No static system lines in the vicinity of the instrument panel could be found or identified, due to the level of damage to the aircraft in that area.

The aircraft's two airspeed indicators were sent to the NTSB Materials Laboratory for

microscopic examination of the indicator faces. The Materials Laboratory reported that at the time they received the indicators, the pilot's indicator read 158 knots and the copilot's indicator read 106 knots, and that microscopic examination of the indicator faces under both incandescent and ultraviolet light revealed no needle transfer marks on the faceplate of either indicator (Materials Laboratory Factual Report No. 99-153, July 13, 1999, attached.)

The aircraft's Lycoming TIO-540-AE2A engine (serial number L-9543-61A) was sent to the facilities of the engine manufacturer, Textron Lycoming, Williamsport, Pennsylvania, for a disassembly examination. This examination was conducted on November 18, 1998, under the supervision of an inspector from the FAA Harrisburg, Pennsylvania, FSDO. The supervising FAA inspector and Textron Lycoming reported that no mechanical or operational failures or abnormalities of the engine were found during the disassembly examination.

The NTSB IIC partially disassembled a section of the KEA-130A encoding altimeter around the static air inlet on September 10, 1999, in order to examine the static air inlet for obstructions or blockages. During this disassembly, significant aft and upward crushing of the altimeter case was noted in the static air inlet area, and the T-fitting connecting the static air line to the case was bent upward into contact with an electrical plug located immediately above the T-fitting. The static air inlet was found to be obstructed by the forward end of a longitudinally-oriented plastic gear shaft installed immediately aft of the static air inlet, and by broken plastic material from casing which surrounded this shaft as normally installed. No foreign objects (i.e. objects or material not used in construction of the internal altimeter mechanism) were found obstructing the static air inlet to the instrument. (NOTE: In this paragraph, "forward" means toward the static air inlet end of the altimeter, and "aft" means toward the indicator face end of the altimeter.)

ADDITIONAL INFORMATION

An investigator from the NTSB Office of Aviation Safety, Human Performance Division, Washington, D.C., conducted interviews with the pilot's wife as well as with officials of Security State Bank and Trust and of Union Bank and Trust Company (UB&T), Evansville, Wisconsin (the bank which the pilot and passenger visited on business during the accident trip), in an effort to reconstruct a history of the pilot's activities for several days preceding the accident. These interviews disclosed the pilot's 4-day activity history prior to the accident as follows.

The purpose of the accident trip was to install an automated voice response system purchased by UB&T from CMSystems, to allow UB&T clients to interact with the bank by telephone. On Tuesday, April 7, 1999, prior to departing on the accident trip, the pilot flew the accident aircraft on a business trip from Polson to Salt Lake City, Utah (a one-way, straight-line distance of approximately 425 nautical miles.) The chief executive officer (CEO) of Security State Bank and Trust, who reported he accompanied the pilot on the trip to Salt Lake City, stated that they departed for Salt Lake in the morning, completed several hours' work, and returned to Polson around 1700 MDT, experiencing no problems with the airplane during the trip. The pilot and accident flight passenger departed on the accident trip to Wisconsin later that evening, arriving at their hotel in the Madison, Wisconsin, area about 0400 on Wednesday, April 8, 1999. A UB&T vice president stated he did not know where the pilot and passenger stayed in the area, since there was no hotel in Evansville. The UB&T vice president stated he believed they stayed either in Madison (about a 30- to 45- minute drive from Evansville) or in Janesville (about a 15- to 20-minute drive from Evansville.)

According to the UB&T vice president, the pilot and passenger began work at the bank about 0830 each day. He reported they worked until after the daily closing of the bank at 1700 (possibly as late as 1800) on Wednesday, April 8, and Thursday, April 9, and departed on Friday, April 10, just before the bank closed. The UB&T vice president reported that the pilot and passenger encountered technical difficulties including differences in network cards during the visit, which the pilot had to resolve since the problems were in his area of computer expertise (as opposed to the passenger's.) The UB&T vice president recalled observing the pilot retrieving weather information for the accident flight on his laptop computer on Friday afternoon. The UB&T vice president reported that the drive from the bank to the Madison, Wisconsin, airport takes about 30 to 45 minutes. The operations manager of Security State Bank and Trust reported that the pilot and passenger originally intended to be back in Polson during daytime on Friday, April 10, but that they were detained by work in Wisconsin.

The pilot's wife reported that the pilot telephoned her from Bismarck approximately 2230 MDT on the evening of Friday, April 10. The pilot's wife stated that her husband wanted to know when their sons were scheduled to play soccer games on Saturday (April 11), as he wanted to attend and had to decide either to return to Denver, Colorado, that night or stop in Polson to sleep. The pilot's wife reported that the games were scheduled at 1100, 1430, and 1700, and that he decided to stop in Polson (at his parents' house.) The pilot's wife stated that this call was routine, and that her husband did not mention anything about the airplane at that time.

A review of FAA Service Difficulty Reports (SDRs) posted on the U.S. Government's FedWorld World Wide Web site between December 1998 and September 1999 disclosed one SDR pertaining to a United Instruments model 5934 altimeter (a non-encoding altimeter of similar design to the United Instruments model 5035 encoding altimeter, incorporating certain parts common to the model 5035) which indicated in the remarks: "ALTIMETER READ 6,000 FEET. GLASS FACE WAS TAPPED ON, READING FELL TO 3,000 FEET...." (FAA control number 99010800105, occurrence date December 14, 1998; found at <http://www.fedworld.gov/pub/faa-asi/sdrc9902.txt>).

The aircraft wreckage, with the exception of the KEA-130A encoding altimeter and the two airspeed indicators, was released to Mr. Myron Carlson of AIG Aviation, Inc., Northglenn, Colorado, on June 9, 1999. AIG Aviation is an insurance firm representing aircraft owner CMSystems, Inc. The KEA-130A encoding altimeter and both airspeed indicators were released to Mr. Carlson on November 17, 1999.

Additional Persons Participating in this Accident Investigation (continued):

Toshio Kawawa United Instruments, Inc. Wichita, KS 67226

Pilot Information

Certificate:	Airline Transport; Commercial	Age:	48, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	06/27/1997
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	11450 hours (Total, all aircraft), 920 hours (Total, this make and model), 60 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N9247W
Model/Series:	PA-46-350P PA-46-350P	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	4622168
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	10/03/1997, Annual	Certified Max Gross Wt.:	4300 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	TIO-540-AE2A
Registered Owner:	CMSYSTEMS INC.	Rated Power:	350 hp
Operator:	CMSYSTEMS INC.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Unknown	Condition of Light:	Night/Dark
Observation Facility, Elevation:	FCA, 2972 ft msl	Distance from Accident Site:	21 Nautical Miles
Observation Time:	0256 MDT	Direction from Accident Site:	289°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	9 Miles
Lowest Ceiling:	Broken / 6000 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	37° C / 37° C
Precipitation and Obscuration:			
Departure Point:	BISMARCK, ND (BIS)	Type of Flight Plan Filed:	IFR
Destination:	KALISPELL, MT (FCA)	Type of Clearance:	IFR
Departure Time:	2358 CDT	Type of Airspace:	Class E

Airport Information

Airport:	GLACIER PARK INTL (FCA)	Runway Surface Type:	
Airport Elevation:	2972 ft	Runway Surface Condition:	
Runway Used:	30	IFR Approach:	VOR
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	GREGG NESEMEIER	Report Date:	12/03/2004
Additional Participating Persons:	ROBERT SPEICHER; HELENA, MT KRIS WETHERELL; VERO BEACH, FL JEFF POSCHWATTA; KENT, WA PHIL GOETTEL; OLATHE, KS		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).