National Transportation Safety Board
Aviation Accident Final Report

Location:	SPOKANE, WA	**Accident Number:**	SEA96FA040
Date & Time:	01/08/1996, 1907 PST	**Registration:**	N117AC
Aircraft:	Cessna 401A	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal, 1 Serious
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled - Air Medical (Medical Emergency)		

Analysis

The pilot (plt) received abbreviated weather (wx) briefing for emergency medical service (EMS)/air ambulance flight (flt). Before flt, he expressed anxiety about possible low visibility for landing & timely transport of dying patient. During ILS runway 3 approach (rwy 3 apch), aircraft (acft) remained well above the glide slope until close to the middle marker; acft's speed decreased from 153 to 100 kts, while vertical speed increased from 711'/min to about 1,250'/min descent. About 1 mi from rwy & 500' agl (in fog), acft abruptly turned left of localizer course & gradually descended with no distress call from plt. Acft hit a pole, then flew into a building & burned. Low ceiling, fog & dark night conditions prevailed. Plt (recent ex-military helicopter plt) had logged/reported 3500 hrs of flt time & about 150 hrs in multiengine airplanes, but there was evidence he lacked experience with actual instrument apchs in fixed-wing acft; he had difficulty with instrument flying during recent training & FAA check flts. No preimpact mechanical problem was found with acft/engines. No ILS anomalies were found. Flt nurse was using cellular phone, but no evidence was found of interference with acft's navigational system. Visibility & ceiling at destination were less than forecast at time of plt's preflt wx briefing. Paramedic was only survivor.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: failure of the pilot to follow proper IFR procedures, by failing to maintain proper alignment with the localizer course during the ILS approach and/or by failing to follow the proper missed approach procedure. Factors relating to the accident were: darkness; adverse weather conditions; and pressure on the pilot to complete the EMS flight, due to the circumstances and conditions that prevailed.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Findings
1. (F) LIGHT CONDITION - DARK NIGHT
2. (F) WEATHER CONDITION - LOW CEILING
3. (F) WEATHER CONDITION - FOG
4. (C) IFR PROCEDURE - NOT FOLLOWED - PILOT IN COMMAND
5. (F) PRESSURE INDUCED BY CONDITIONS/EVENTS - PILOT IN COMMAND
6. COMM/NAV EQUIPMENT,TRANSCEIVER - ACTIVATED
7. (C) MISSED APPROACH - NOT FOLLOWED - PILOT IN COMMAND
8. OBJECT - POLE
9. OBJECT - BUILDING(NONRESIDENTIAL)

Factual Information

HISTORY OF FLIGHT

On January 8, 1996, at 1907 Pacific standard time, N117AC, a Cessna 401, operated by Pacific States Charter Services, Inc., as Aeromed Lifeguard 117AC, collided with a pole and a building during an instrument approach to runway 3 at the Spokane International Airport, Spokane, Washington. The airplane was destroyed and there was a ground fire. The commercial pilot and two passengers were fatally injured. A third passenger received serious injuries. Instrument meteorological conditions prevailed and an instrument flight rules (IFR) flight plan had been filed. The air medical transport flight departed from Pasco, Washington, at 1829 and was destined for Spokane. The flight was conducted under 14 CFR 135.

In an interview (record attached) with the Safety Board, the sole survivor of the accident stated that he was at home near Kennewick, Washington, and "on call" as Aeromed's flight paramedic on the day of the accident. He stated he received a telephone call from the accident pilot who told him that a patient needed to be flown from Pasco to Spokane for urgent medical treatment. The paramedic later arrived at Our Lady of Lourdes Hospital in Pasco to review the patient's charts. He was met by the pilot and a flight nurse. The paramedic stated that the patient's condition was "critical" and that he "didn't think she would make it" to Spokane. Nevertheless, the three Aeromed employees "wasted no time" to get to the Tri-Cities Airport in Pasco in order to fly the patient to the Spokane International Airport for emergency surgery at the Deaconess Hospital in Spokane.

After arriving at the Tri-Cities Airport via ground ambulance, the paramedic helped load the patient into the accident airplane. He stated that the pilot "prepped the plane" and helped transfer medical equipment into the aircraft. The paramedic also stated that it was a "clear night" at the airport, and that the pilot appeared "typical" and "serious." According to the paramedic, the pilot did not indicate that he was having any problems with himself or the airplane, and the pilot wanted to take off as soon as possible. The paramedic said the pilot made statements such as "hurry up...let's go."

The paramedic also stated that about 15 minutes passed from the time they had arrived at the Tri-Cities Airport to the time the aircraft was airborne. He stated that he did not perceive any problems with the airplane during start-up, taxi, or takeoff. He and the flight nurse were seated at the rear of the aircraft, at the feet of the patient's gurney, and were not wearing headsets. The paramedic stated that he was seated on the left side of the aircraft in "front of the back seat."

According to transcripts and records (attached) provided by the Federal Aviation Administration (FAA), a person identifying himself as the pilot of N117AC telephoned the Seattle Automated Flight Service Station (AFSS) at 1719 to receive an abbreviated weather briefing. The pilot requested the current weather conditions at the Spokane International Airport, and was told by the AFSS briefer: "measured ceiling three hundred overcast, visibility one zero...." The pilot also asked: "has the visibility dropped below two miles, is there a fog bank coming in?" The briefer stated: "nah it just the temperature dew point is close together there and they're forecast until [2000 hours] is ceiling of four hundred overcast, visibility three in fog." The pilot responded with "okay, as long as we stay above that three we're in good shape. Thank you sir."

Thirty-seven minutes later, at 1757, the pilot again telephoned the AFSS to file an IFR flight plan from Pasco to Spokane. The pilot told the briefer that he did not "have my flight plan right in front of me. It's kind of expeditious filing here ...." The pilot did not file for an alternate destination, as required by 14 CFR 135.223. The briefer accepted the flight plan and the call was completed at 1758.

Thirty-one minutes after the pilot filed the flight plan, at 1829, the flight departed from Pasco and the pilot initiated communications with air traffic control (ATC).

The paramedic stated that during the flight, he was busy caring for the critical patient. He stated that it was a "hectic flight" as he was out of his seat the majority of the flight and "constantly pushing drugs" into the patient. He stated that he did not perceive any problems with the airplane during the cruise portion of the flight. He recalled that the flight nurse initiated two calls from a cellular telephone on board the aircraft. One of the calls was made just prior to the accident, and he stated that the flight nurse may have been using the cellular telephone at the time of the accident.

The Safety Board interviewed (record attached) a nurse employed by the Deaconess Hospital in Spokane who was the recipient of two telephone calls from the flight nurse. The Spokane nurse stated that she was working at the hospital on the evening of the accident. At 1845, as verified by a log entry, she received a telephone call from the flight nurse aboard the accident flight. The Spokane nurse took down a report regarding the patient's status. She stated that the flight nurse provided a "thorough" report of the patient, and that the flight would be on the ground about 1915. The Spokane nurse also stated that the reception of the telephone transmission was "clear...but some breaking up," and that it was "hard to hear." The Spokane nurse recalled that the flight nurse said the on-board patient was "alert but confused," "on breathing oxygen" and was experiencing "significant pain."

Later, sometime between 1905 and 1912, the flight nurse again called the Spokane nurse. She recalled that the flight nurse said: "This is Aeromed. We are ...." The Spokane nurse stated that this is all that was said, and then the connection ended. The Spokane nurse also recalled hearing a "man's voice in the background" and "no alarms or beeping" during the short transmission. The Spokane nurse stated that the call ended with abrupt "silence.... as if the line was cut off, as if you were to hang up."

The Safety Board obtained telephone records from a representative of Aeromed. A review of the records (attached) revealed that a telephone call was placed from the airplane to the Deaconess Hospital at 1843 for a duration of 2 minutes, and another call was made at 1906 for a duration of one minute.

According to ATC recorded voice communications and radar data (attached), the pilot was cleared for the instrument landing system (ILS) approach to runway 3 at 1902:17 by Spokane Approach Control. The pilot acknowledged the clearance and the airplane was established on the localizer course to the runway. At 1904:07, the pilot was instructed to contact the Spokane Tower, which he performed. At 1904:50, the pilot was cleared to land on runway 3 by the tower controller, and he was given wind and runway visual range information. The pilot acknowledged the clearance; this was his last recorded transmission. No distress calls from the airplane were recorded, and all previous communications had been routine and professional.

According to a Recorded Radar Study (report attached) performed by the Safety Board's

Office of Research and Engineering, the airplane was established on the center of the ILS runway 3 localizer course while descending through 4,400 feet msl at the time the pilot was given clearance to land. The airplane was also about 500 feet above the center of the ILS runway 3 glide slope course, and was traveling at 153 knots true air speed. During the subsequent 90 seconds of flight, as the airplane continued its approach, its true airspeed decreased from 153 knots to 100 knots, while its vertical speed increased from a 711-feet-per-minute descent to about a 1,250-feet-per-minute descent. The airplane continued to track within the localizer course width during this time, but it remained high on the glide slope course without ever descending to the center of it.

At 1906:13, while the airplane was about 1 mile from the runway 3 threshold and about 500 feet above the ground, the airplane initiated an abrupt turn to the left with about 15 degrees angle of bank; it changed course from 038 degrees magnetic to 303 degrees magnetic. During this 95-degree course change, the airplane's true airspeed increased from 100 knots to 129 knots, its rate of descent gradually decreased to zero, and it flew less than 200 feet above the ground as it exited out of and away from the localizer course. After the abrupt course change, the airplane continued to fly away from the localizer in a northerly direction for about 40 seconds, with no radio communications from the pilot. An emergency locator transmitter (ELT) beacon was received by ATC at 1907:03; the closest radar data point to this time indicates that the airplane was in the vicinity of a power pole. The final radar data point was recorded 10 seconds after the beginning of the ELT signal (1907:13), and the point corresponds to the coordinates of the crash site.

A Cessna 172 pilot (statement attached) who was following the accident airplane on the approach stated that he remembered that the accident airplane descended into the fog when it was about 4 miles outside of the outer marker OLAKE, and he stated that the airplane may have been "still on an intercept" for the localizer at the time he last saw it. He stated that he saw the accident airplane disappear into the fog when it was "pretty much wings level," and he stated that he was about 1 mile behind the accident airplane at that time.

The paramedic stated that he recalled a "thump" that shook the airplane. The "thump" felt "...like a jarring motion... like a low speed impact." He remembered that he looked out the window and "saw sparks shooting out of the left engine," but no fire. He said that he yelled at the flight nurse to "assume the crash position." He further stated that he looked up at the pilot and the pilot looked back at him "for a brief second" with an expression of "fear" on the pilot's face. The paramedic stated that the pilot did not say anything to the paramedic during this interaction. The paramedic then perceived a sharp left turn after the "thump" and "had enough time to curl up in a ball," just prior to the impact.

A ground eyewitness reported (report attached) that the airplane was flying "low and fast and loud," just before it impacted a building located 1.4 nautical miles northwest of the center of the airport.

The accident occurred during dark night conditions at the following coordinates: North 47 degrees, 37.81 minutes; West 117 degrees, 33.91 minutes.

OTHER DAMAGE

The airplane impacted a commercial building used for manufacturing large tanks and equipment. The roof structure and south wall were partially destroyed by impact forces and post-crash fire. Equipment stored inside the building, including a motor vehicle, trailer, tool

and dye fixtures, and newly-completed tanks, were also damaged. The total amount of the structural and equipment damage was estimated to be about $428,000.

AIRCRAFT INFORMATION

The accident airplane, a Cessna model 401A, was manufactured in 1969. It was powered by two 300-horsepower Continental turbocharged, propeller-driven engines, had a maximum gross landing weight of 6,200 pounds, and was configured as a flying medical ambulance. The airplane was registered to RMA Inc., doing business as Spokane Airways, leased back to the Pacific States Charter Service, Inc., and operated as Aeromed, Inc. It was the only aircraft in Aeromed's livery; and the operator was decertified by the FAA shortly after the accident.

The aircraft maintenance records were not recovered and were presumed to have been destroyed in the accident. The Safety Board collected and examined copies of maintenance work orders for the aircraft that were obtained from Spokane Airways. The examination revealed that the airplane had received a 50-hour inspection and oil change on December 15, 1995, with no unresolved discrepancies noted. The airplane had logged a total of 5,845 hours at the time of the inspection. The records also indicated that the airplane received a 100-hour/annual inspection on October 6, 1995, with no unresolved discrepancies noted.

One work order, dated September 19, 1995, indicated that the "autopilot requires more work." This record was attached to another work order, dated October 5, 1995, which indicated that an "avionics repair" had been performed, with no other details of the repair provided. Another work order indicated that both propellers were removed on June 22, 1995, for overhaul. Also, the airplane passed an "IFR certification" during an inspection that was documented on a work order dated March 27, 1995.

The Safety Board could not conclusively determine what avionics had been installed and were operating on the airplane immediately prior to the accident, due to the destruction of the avionics and maintenance records in the accident. According to a review of the work orders obtained by Spokane Airways, the following avionics equipment had been installed in the airplane prior to the accident:

Two Bendix/King KX-155 navigation/communication digital transceivers Bendix/King KI-208 navigational head(s) Bendix/King KMA-24 Audio Panel Cessna 400A Navamatic Autopilot Cessna/EDO Air Horizontal Situational Indicator Bendix/King KN-64 Distance Measuring Equipment Bendix/King KT-76A Transponder Collins ADF-650 Automatic Direction Finder Bendix/King Radar ARNAV 20 LORAN According to receipts obtained from Bergstrom Aircraft, Inc., a fixed based operator at the Tri-Cities Airport in Pasco, the accident airplane received 23.4 gallons of 100 low lead aviation fuel on the day of the accident.

PERSONNEL INFORMATION

The pilot, age 36, held an FAA commercial pilot certificate with ratings for airplane single-engine land, airplane multiengine land, rotorcraft-helicopter, and instrument airplane/helicopter. The pilot's personal flight log books were not recovered. According to an insurance application (attached) that was completed by the pilot two months prior to the accident, that pilot had logged a total of 369.7 hours of civilian pilot-in-command (PIC) flight time in fixed-wing airplanes, including 149.8 hours in multiengine airplanes and 62.2 hours in

the Cessna 401A. The pilot also reported that he had logged 22.3 hours of PIC time under either simulated or actual instrument conditions during the previous six months from the date of the application.

The pilot further reported in the application that he had been previously employed as a helicopter pilot while serving as an officer of the United States Marine Corps. He graduated from the U.S. Navy Flight School in 1982 where he received his initial flight training in fixed-wing airplanes. He was then trained as a helicopter pilot and logged 2,543 hours in the Sikorsky CH-53E military helicopter. He was discharged from the military in early 1995; he became the chief executive officer and sole pilot of Aeromed on May 1, 1995.

According to FAA records, the pilot was issued an FAA Second Class Medical Certificate on June 6, 1995, with no limitations. The pilot indicated that he had logged a total of 3,500 flight hours at the time of the medical application.

According to records (excerpts attached) obtained from FlightSafety International of Long Beach, California, the pilot successfully completed a 5-day course entitled "Cessna 402B Tip Tank Pilot Initial Course" on July 5, 1995. According to the records, the pilot logged 7.5 hours in a Cessna 402B procedures ground trainer and 7.5 hours in a Cessna 402B flight simulator. The records also indicated that the pilot experienced some difficulty during training sessions involving ILS approaches, instrument navigation, use of the horizontal situation indicator, and aircraft control.

The Safety Board also reviewed the FAA Part 135 Airmen Competency/Proficiency Checks (FAA Forms 8410-3 are attached) that were performed on the pilot for certification as Aeromed's pilot. The pilot failed his first check on August 9, 1996; the reason cited for the failure was "Oral [examination] unsatisfactory, specifically related to IFR operations." The form indicated that the oral examination was 1.5 hours. The pilot's second attempt, on August 22, 1995, also ended in failure; the reason cited was "unsatisfactory" performance during holding procedures and an instrument approach. The form indicated that the flight check was 1.5 hours. The pilot successfully passed his third FAA check on August 29, 1996, after a 1.5-hour flight. All three check flights were performed in the accident airplane.

According to a representative of Aeromed, the pilot's flight previous to the accident flight occurred on December 28, 1995. Flight planning documents (attached) indicate that the pilot flew the accident airplane from Pasco to Spokane to transport a patient. The flight was designated as mission number 95-031, and was scheduled to occur during daylight hours and in marginal VFR conditions.

The paramedic who survived the accident stated that he had flown with the pilot on about 20 missions during the weeks and months prior to the accident, and he highly regarded him as a pilot. He stated that the pilot "never" liked to fly with the autopilot because the pilot "couldn't trust it." The paramedic further stated that during all of the previous flights with the pilot, they "never flew in the fog" but "sometimes in between cloud layers and in turbulence." The paramedic also recalled a flight to LaGrande, Oregon, in which the pilot turned back due to adverse weather.

METEOROLOGICAL INFORMATION

The Safety Board reviewed the recorded National Weather Service observations (print-out attached) of the Automated Surface Observation System (ASOS) installed at the Spokane International Airport for the times surrounding the time of the accident. A review of the

recorded ASOS observations taken before, during, and after the accident (from 1758 through 1944) revealed that the cloud ceiling deteriorated from 300 feet measured overcast to an indefinite, obscured ceiling of 100 feet. The visibility also decreased from greater than 10 miles to less than 1/4-mile in fog during this same time period. The Spokane ASOS is designated as an "augmented" site; it is automated and also operates with human on-station oversight and possible intervention which produce observations of weather elements and remarks that the automated systems cannot detect or generate.

According to the ASOS report, the following conditions prevailed at the time of the accident: measured cloud ceiling 100 feet overcast above ground level, visibility 1/4-mile in fog, temperature 34 degrees F, dew point 34 degrees F, winds from 050 degrees magnetic at 4 knots, control tower visibility 1/4-mile, and no reported precipitation. Dark night conditions prevailed at the time of the accident.

The Safety Board also reviewed the recorded voice communications with ATC in an effort to obtain additional meteorological information. About 6 seconds prior to the sound of the ELT on the tower recording, the tower controller was in radio communication with a single-engine Cessna that was following the accident airplane on the ILS runway 3 approach. The controller cleared the single-engine Cessna to land and relayed the runway visual ranges (RVR) for the touchdown, midfield, and rollout portions of runway 3 as 3,000 feet, 2,400 feet, and 2,200 feet respectively. After the ELT signal was heard, the tower controller attempted to contact the accident airplane, and then told the single-engine Cessna pilot to abandon his approach.

Further review of the controller's RVR reports revealed the following varying and worsening visibility conditions:

	Time 1854:19	Time 1904:51	Time 1906:40
Touchdown RVR	3,000 feet	3,500 feet	3,000 feet
Midfield RVR	4,000 feet	2,600 feet	2,400 feet
Rollout RVR	3,500 feet	2,200 feet	2,200 feet

The recorded voice communications also revealed that the accident pilot reported that the in-flight weather conditions were "clear [with] probably about 26 miles visibility" about 9 minutes prior to the accident as the airplane was flying at 5,000 feet msl (about 2,600 feet above the ground). The pilot acknowledged that he had received the Spokane Automated Terminal Information Service (ATIS) recording, designated as "Information Mike," at 1854, when he checked in with Spokane Approach Control. Information Mike continued to be broadcast until it was updated after the accident. Information Mike was recorded at 1832, or 22 minutes prior to the pilot's initial contact with Spokane Approach Control, and it reported the following conditions: measured ceiling 300 feet overcast, visibility 1/2-mile in fog, temperature 34 degrees F, dew point 34 degrees F, wind 050 degrees magnetic at 4 knots.

A review of the ASOS observations during the 22-minute time-frame indicated that the ceiling had decreased from 300 feet to 100 feet, while the visibility remained at 1/2-mile. When the accident airplane was cleared to land at 1904:51, the tower controller told the pilot that the runway visual ranges for the threshold, mid-field, and roll-out portions of runway 3 were 3,500 feet, 2,600 feet, and 2,200 feet respectively. The pilot acknowledged and continued the approach.

The Cessna pilot who was following the accident airplane stated that "good VFR"

conditions existed above the fog layer at the time of the accident, and that there was a "solid layer of fog in the vicinity of the airport and south." He remembered that the top of the fog layer was "1,000 feet [above the ground] at the most," and that the accident site would have also been covered by the solid layer of fog.

AERODROME AND GROUND FACILITIES

The Spokane International Airport is served by two paved runways and ATC services. The field elevation is 2,372 feet msl. Runway 03-21 (the accident approach runway) is 9,000 feet long and 150 feet wide. At the time of the accident, there was a full ILS Category 1 approach to runway 3 in service. According to the terminal approach procedure diagram (attached), the touchdown zone elevation of runway 3 is 2,368 feet msl and the approach course is 025 degrees magnetic. The complete straight-in approach procedure, utilizing an operable localizer (course guidance) and glide slope (descent guidance), calls for a visibility minima of 1,800 feet RVR or 1/2-mile at the decision height. The decision height is published as 2,568 feet msl, or 200 feet above the ground. If the runway environment is not visible at the decision height, the published procedure calls for the execution a missed approach procedure involving an immediate, straight-out climb to 5,000 feet msl on a heading of 025 degrees.

The ILS runway 3 approach is served by an outer marker beacon designated as "OLAKE," and a middle marker. The outer marker is located about 4.5 nautical miles from the approach end of runway 3. According to the published terminal approach procedure, the center of the glide slope course occurs at 3,858 feet msl. The approach is also served by a middle marker beacon, located 0.5 nautical miles from the approach end of runway 3. The center of the glide slope course intersects the middle marker at 2,576 feet msl (208 feet above the ground).

The Cessna pilot who was following the accident airplane stated that he remembered the indications of the cockpit instruments "appeared normal" as he began the ILS runway 3 approach. He remembered that ATC then told him to "go around" during his approach because of the accident, and he subsequently landed at a nearby airport.

The FAA conducted a flight inspection of the ILS runway 3 approach about 21 hours after the accident. The flight included an inspection of the localizer, glide slope, distance measuring equipment, lighting system, marker beacons, and obstacle clearance. According to the report of inspection (attached): "[the] facility operation [was] found satisfactory." The Safety Board also reviewed the FAA flight routing periodic inspection reports (attached) that were performed on November 16, 1995, and March 14, 1995. Satisfactory results were reported during the inspections.

The Safety Board visited the FAA Airways Facilities sector office in Spokane on January 11, 1996, and again on April 25, 1996, to review facility performance records associated with the ILS runway 3 equipment. According to the review, the localizer received routine maintenance five days prior to the accident, and no unresolved discrepancies were noted. The localizer is self-monitoring, and an alarm sounds in the control tower cab if any anomalies are detected. According to FAA personnel, no alarms or anomalies with the localizer or any of the ILS equipment were reported.

The Safety Board also attempted to determine if any airplanes or vehicles were present at the time of the accident that would have interfered with the transmission of the ILS equipment. A review of the ATC transcripts did not reveal any evidence of other aircraft or

vehicles near the ILS critical areas at the time of the accident airplane's final approach.

On February 12, 1996, despite the lack of any evidence of an anomaly, the FAA raised the decision height of the ILS runway 3 approach from 200 feet above the ground to 500 feet. These amendments (excerpts attached) remained in effect until a new Category 3 ILS approach was installed and activated in late 1996. The new ILS equipment had been scheduled to be installed prior to the accident.

Runway 3 is also served by a Medium Intensity Approach Lighting System (MALSR) with Runway Alignment Indicator Lights. The lighting system includes sequenced white flashing lights that lead into rows of white lights and a line of green lights that mark the runway's approach end. The runway itself includes touchdown zone lighting, centerline lighting, and edge lights. According to the Aircraft Accident Equipment Status sheet (attached) submitted by the Spokane ATC personnel immediately following the accident, the MALSR, sequenced flashers, touchdown zone lights, centerline lights, and edge for runway 3 were activated at the time of the accident.

The airport is also served by runway 07-25. According to the Aircraft Accident Equipment Status sheet, all lights associated with this runway were off at the time of the accident, except for the Visual Approach Slope Indicator (VASI) lights, which is on at all times. According to the FAA, the runway end identifier lights for runway 7 are activated at any time the runway 7 edge lights are activated; there are no separate switches.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was examined at the accident site by the Safety Board on January 9, 1996, the morning after the accident, and again on January 10, 1996. The airplane came to rest inside a commercial building located 1.4 nautical miles west northwest of the center of the Spokane International Airport. Impact damage was noted at the juncture between the 24-foot-high roof and the southern wall of the building. Evidence of a ground fire was found throughout the entire impact area. The outboard portion of the left wing, including the tip tank, was found on the roof of the building. The remainder of the airplane wreckage was found inside the building and resting on top of a truck, trailer, oil tank, and tank production equipment. The cockpit and cabin area had been completely destroyed in the ground fire.

Evidence of a sheared electrical power pole was found 0.34 nautical miles southeast of the main wreckage. The pole had been sheared about 30 feet above the ground and was oriented along a magnetic bearing of 304 degrees to the main wreckage site. A piece of aircraft skin was found at the base of the power pole. Investigators determined that the piece had originated from the bottom of the left engine nacelle.

No evidence of an in-flight fire, in-flight explosion, or in-flight structural failure was found. All primary and secondary flight control surfaces were accounted for at the main accident site. No evidence was found to indicate a flight control deficiency. Continuity of the flight control, electrical, fuel, and vacuum systems could not be verified due to fire and impact damage. The flap attached to the left wing was in an extended position; the electrically-driven flap device was not located. The rudder trim actuator was found in the 2.5 degree tab right position. The elevator trim tab actuator was found in the neutral position. The landing gear was found in the extended position. All cockpit controls, instruments, radios, and switches were destroyed due to fire and impact damage. An altimeter setting was indicating 30.13; no other instruments or cockpit readings could be obtained.

Both engines were externally examined prior to their movement to a teardown facility for a detailed inspection. The right engine was found resting to the right of the cabin area as viewed looking forward from the tail of the airplane. The wing structure had been burned away from the engine. The right engine exhibited evidence of ground fire damage. The oil sump, rocker box covers, ignition leads, throttle body, and turbocharger were all burned. No holes were found in the crankcase. Six spark plugs were removed and examined with no remarkable findings noted.

The right propeller remained attached to the engine and would not rotate under manual force. Two of the three blades had about 12 inches of melted blade root remaining; the third blade had been completely melted down to the hub. All three blades were secure in the hub.

The left engine was found resting to the left of the cabin area as viewed looking forward from the tail of the airplane. It remained cowled and was attached to its firewall. The forward portion of the left engine nacelle had separated from the left wing, and all engine control cables were found to be stretched and separated. No evidence of thermal damage was noted on the engine, and no holes were found in the crankcase. Spark plugs from each cylinder were removed and examined with no remarkable findings noted.

The left propeller remained attached to the engine and would rotate under manual force. Two of the three propeller blades were loose in the hub. Propeller blade "A" was missing about 6 inches of its tip. This blade exhibited leading edge damage and chordwise gouging. Blade "B" was bent aft about 45 degrees; this blade exhibited leading and trailing edge gouging and chordwise scratching. Blade "C" exhibited evidence of deeper and more severe leading edge gouging than the other two blades; this blade was bent aft about 30 degrees, and its rubber boot exhibited evidence of chordwise gouging.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by Dr. Dexter Amend, M.D., on January 10, 1996, at the Holy Family Hospital Forensic Institute in Spokane. According to the report of autopsy: "Typical control injuries, as one might expect in the hand/wrist and foot/ankle regions, were not evident.... No physical abnormality which would be expected to significantly impair his ability to pilot an aircraft was detected at autopsy. The manner of death is accidental (air traffic)."

Specimens taken from the pilot were analyzed by the FAA Civil Aeromedical Institute, Oklahoma City, Oklahoma. According to their report (attached), negative results for alcohol, carboxyhemoglobin, cyanide, and all screened drugs were reported.

TESTS AND RESEARCH

Engine Disassembly and Inspection.

Both engines were removed from the accident site and shipped under Safety Board supervision to facilities operated by Teledyne Continental Motors in Mobile, Alabama. The engines and their associated accessories were disassembled and inspected by the Safety Board and its investigative participants on April 1 - 2, 1996. The inspection (excerpts of engine and turbocharger reports from manufacturers attached) did not reveal any evidence of preimpact mechanical malfunction.

Cellular Telephone Transmission Interference Tests.

On March 1, 1997, at Boeing Field, Seattle, the Safety Board conducted a ground test (test plan attached) to determine the possible effects of cellular telephone transmissions on aircraft navigational receivers. A Cessna 402 with similar localizer receivers (specifications attached) as the accident airplane was used in the test. Also, the same make and model of cellular telephone (specifications attached) was used, and the test was conducted by transmitting a signal tuned to the same frequency as the Spokane ILS runway 3 localizer while the cellular telephone was activated by calling the same telephone number called during the accident. The tests revealed that no effects were noted with either navigational indicator, in either the localizer or glide slope mode, in any cellular telephone position inside the cockpit (including the cellular telephone antenna touching the airplane transceivers), and at varying signal generator signal strengths, antenna positions, and needle offsets.

Flight Path Simulation and Airport Lighting Observations.

On the evening of March 10, 1997, the Safety Board conducted an actual flight (report attached) in an airplane to simulate the flight path of the accident flight for the purpose of surveying the lighting effects of the Spokane International Airport and surrounding area. Observations during the flight did not reveal any distinct lighting features that resembled approach lighting or runway lighting outside of the runway 3 lighting area, and/or in the vicinity of the accident site. A cluster of five bright orange sodium lamp lights were observed about 1/4-mile to the west of the accident site. These lights were surrounded by a larger area of darkness, except the accident site area itself, which contained one bright orange light and several smaller white lights in a random collection. The cluster of orange lights could be easily seen at about the 9:30 position while aligned with the runway 3 centerline at 500 feet above the ground and 1 mile from the runway. After the airplane was turned to the left to recreate the flight path of the accident flight, the cluster of orange lights appeared at about the 11:00 position, while the dimmer accident site lights were about the 12:00 position. Subsequent orbiting of the cluster revealed that the lights provided ground lighting for a large industrial building.

The Cessna pilot who was following the accident airplane during the approach also stated that he did not notice any unusual lighting effects during his approach on the evening of the accident that could have been confused with an airport or runway.

Previous Accidents Involving ILS Runway 3.

On December 14, 1993, at 2101, a Piper PA-32R-300 was destroyed when it collided with terrain during an ILS approach to runway 3 at Spokane. The commercial pilot, who was the sole occupant of the aircraft, was fatally injured. The flight was carrying canceled checks and was conducted under 14 CFR 135. According to NTSB Case No. SEA94FA040 (excerpts attached), the pilot had missed one ILS approach and was on his second ILS approach to runway 3 at the time of the accident. Radar data showed the aircraft tracking the localizer course until gradually turning to the left about 2 miles from the approach end of the runway. The aircraft crashed about 1/4-mile northwest of the localizer centerline, approximately abeam the middle marker. The impact scar was oriented about 310 degrees magnetic. The Safety Board determined that the probable cause of the accident was: "...the pilot's failure to maintain proper alignment with the ILS approach course..." and a contributing factor was "...the pilot's failure to perform a missed approach...."

Previous Incidents Involving ILS Runway 3.

The Safety Board received three reports of anomalies with the Spokane ILS runway 3 approach from air carrier pilots following the accident. The Safety Board interviewed the pilots and collected data on the reports (attached). The first reported incident was from an Alaska Airlines McDonnell Douglas MD-80 on January 6, 1996. The crew performed a missed approach while on an actual instrument approach to the runway because the airplane was "S-turning" while in autopilot mode. Their second approach was uneventful. The second incident was a Southwest Airlines Boeing 737 on January 11, 1996. The crew performed a missed approach while on an actual instrument approach to the runway because the airplane's ground proximity warning system activated. Their second approach was uneventful. The third incident involved a Horizon Airlines Dornier DO-328 on February 4, 1996. The crew performed two missed approaches due to oscillating localizer indications. The airplane landed uneventfully after the third approach. Horizon Airlines stated that "large amounts of ice build up" were removed from the localizer antennas after the flight, and the localizer receivers "tests good."

AFSS Terminal Forecast.

The Safety Board obtained and reviewed the information provided to the AFSS briefer at the time the accident pilot obtained his weather briefing. The review revealed that the briefer provided the pilot with the most up-to-date and complete terminal forecast available for the Spokane International Airport. This forecast called for a 400-foot cloud ceiling and 3 miles visibility until 2000 hours. The next updated terminal forecast, which called for a ceiling of 100 feet and a visibility of 1/2-mile, was issued by the NWS at 1839, or 28 minutes prior to the accident, after the pilot had already departed on the accident flight.

ADDITIONAL INFORMATION

The aircraft wreckage, except for both engines, was released to Mr. Richard Homel, AIG Aviation Insurance Services, Los Angeles, California, on January 23, 1996. Mr. Homel was representing the registered owner of the airplane at the time of the release. The engines were later released to Mr. Homel on April 5, 1996.

Pilot Information

Certificate:	Commercial; Military	**Age:**	36, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	06/06/1995
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	3500 hours (Total, all aircraft), 70 hours (Total, this make and model), 3120 hours (Pilot In Command, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N117AC
Model/Series:	401A 401A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	401A0040
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	10/04/1995, 100 Hour	**Certified Max Gross Wt.:**	6300 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	5800 Hours	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-520-E
Registered Owner:	RMA, INC.(DBA SPOKANE AIRWAYS)	**Rated Power:**	300 hp
Operator:	PACIFIC STATES CHARTER SERVICE	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:	AEROMED	**Operator Designator Code:**	PS7A

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Night/Dark
Observation Facility, Elevation:	GEG, 2372 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	1905 PST	**Direction from Accident Site:**	97°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	0.25 Miles
Lowest Ceiling:	Overcast / 100 ft agl	**Visibility (RVR):**	3000 ft
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	50°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	34°C / 34°C
Precipitation and Obscuration:			
Departure Point:	PASCO, WA (PSC)	**Type of Flight Plan Filed:**	IFR
Destination:	(GEG)	**Type of Clearance:**	IFR
Departure Time:	1829 PST	**Type of Airspace:**	Class C

Airport Information

Airport:	SPOKANE INT'L (GEG)	**Runway Surface Type:**	Asphalt
Airport Elevation:	2372 ft	**Runway Surface Condition:**	
Runway Used:	3	**IFR Approach:**	ILS
Runway Length/Width:	9000 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal, 1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-Ground
Total Injuries:	3 Fatal, 1 Serious	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	JEFFREY B GUZZETTI	**Report Date:**	06/30/1997
Additional Participating Persons:	DAVID T PURTILL; SPOKANE, WA WILLIAM B WELCH; WICHITA, KS SCOTT BOYLE; ARVADA, CO STEVE MACON; PHOENIX, AZ		
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.ntsb.gov/pubdms/.		