National Transportation Safety Board
Aviation Accident Final Report

Location:	Walnut Grove, Arkansas	**Accident Number:**	CEN10FA509
Date & Time:	August 31, 2010, 03:55 Local	**Registration:**	N62AE
Aircraft:	BELL HELICOPTER TEXTRON 206L-1	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The air ambulance positioning flight was en route to a landing zone to pick up a patient for transfer. One witness in the accident area described a helicopter circling overhead, and another witness reported that they heard the sound of crashing metal or the impact of the helicopter with the ground.

Radar and global positioning system data depicted the accident helicopter reversing course multiple times just prior to the accident. The flight path of the helicopter prior to the accident was consistent with spatial disorientation and subsequent loss of control due to an inadvertent encounter with instrument meteorological conditions.

The wreckage was located in forested terrain approximately 3.5 miles south of the intended destination. The wreckage distribution was consistent with an in-flight separation of the main rotor and tail boom. An examination of the helicopter airframe, engine, and related systems revealed no pre-impact anomalies. Both the main rotor assembly and tail boom separated in overload. The main rotor tie down strap found wrapped around the blade was a result of the accident sequence and did not contribute to the accident.

Weather information indicated a moist stable environment from the surface to approximately 2,500 feet, which supported low clouds and stratus below 2,500 feet. In addition, an AIRMET had been issued for instrument meteorological conditions (IMC) due to low ceilings and poor visibility. The Area Forecast advised of marginal visual meteorological conditions in the state of Arkansas. Witnesses in the area described the weather as hazy or foggy, with overcast skies. One witness stated that it was very dark and no moon could be seen. The investigation was unable to determine what information the pilot had or method he used to obtain weather

information prior to the flight.

The pilot held a commercial pilot certificate and an instrument rating. He had received instrument training, including inadvertent flight into IMC; however, the company did not operate in IMC. The pilot was trained and had recent experience in the use of night vision goggles. The investigation was unable to determine if the pilot was using the night vision goggles at the time of the accident. While toxicological results were positive for ethanol, the samples were contaminated and the source of the ethanol could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of aircraft control, due to spatial disorientation, resulting in the in-flight separation of the main rotor and tail boom.

Findings

Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Aircraft	(general) - Not specified
Aircraft	(general) - Not specified

Factual Information

HISTORY OF FLIGHT

On August 31, 2010, at 0355 central daylight time, a Bell 206L-1, N62AE, owned by Air Evac EMS, Inc, (Air Evac) and operated as Air Evac 30, was substantially damaged when it impacted terrain following an in-flight break-up near Walnut Grove, Arkansas. Dark night instrument meteorological conditions prevailed at the time of the accident. The emergency medical services (EMS) positioning flight was being operated under the provisions of 14 Code of Federal Regulations (CFR) Part 91 on a company flight plan. The pilot, flight nurse, and flight paramedic were all fatally injured. The flight departed Vilonia (AE30), Arkansas, at 0335 and was en route to Crabtree, Arkansas, to pick-up a patient.

According to recorded communications, the request for the accident flight came from the Van Buren County 911 dispatch at 0316:45. The county dispatcher contacted the Air Evac Communications Center (located in West Plains, Missouri), and requested that a flight be placed on standby to transport a patient from Crabtree, Arkansas. The dispatcher commented that she was not sure the flight could go, as they had "some crappy weather" in Van Buren County. The communications center operator stated that the crew would check weather and let them know if the flight could be accepted. The Air Evac communications center contacted the flight crew of Air Evac 30 at 0319 and at 0322, the flight crew confirmed that the weather was "good" for the flight. Air Evac 30 was dispatched at 0322:36.

Air Evac 30 contacted the Air Evac communications center on the LONOKE communications tower, operated by Air Evac, at 0339:35 and provided souls and fuel on board, estimated time en route of 27 minutes, a planned altitude of 1,200 feet above ground level (agl), and a risk assessment score of 15.

Radar data, provided by the Federal Aviation Administration (FAA), identified and depicted the accident flight from the time of departure from AE30 to the time of the accident. The helicopter climbed to an altitude ranging from 2,000 to 2,600 feet mean sea level (msl). The last radar information was recorded at 0355:45 at an altitude of 2,700 feet msl.

The helicopter was equipped with a Garmin 396 Global Positioning System (GPS). The tracklog recovered from the unit began at GPS coordinates of 35 degrees 5 minutes 0.02 seconds north and 092 degrees 12 minutes 0.9 seconds west at 0335:35. The final GPS location was recorded at 0355:52 at GPS coordinates of 35 degrees 33 minutes 41.98 seconds north and 092 degrees 33 minutes 9.7 seconds west at an altitude of 1,760 feet. The last calculated velocity and direction of travel was 70 knots groundspeed with a course of 001 degrees true. The last minute of data depicted a turn to the left, a turn to the right, a reversal to the left, a reversal back to the right, and then a final reversal to the left.

In addition to the FAA radar data and the Garmin GPS data, Air Evac 30 was being tracked by the company's operational control center utilizing a flight-tracking program and equipment entitled Skytrac. This program logged information such as location, altitude, flight path, and velocity, and was updated every 60 seconds. According to the Skytrac log, Air Evac 30 was first

identified at 0337 south, southeast of the Vilonia base. The flight track was the same as the tracks depicted by the radar and GPS data. The last position was recorded at 0354, 4.4 miles south southeast of the Ozark Health Medical Center at an altitude of 1,800 feet and a ground speed of 119 knots.

Several witnesses in the area reported hearing the sounds of the rotor blades as normal and then heard the sound of the rotor blades slow in speed. One witnesses reported seeing the helicopter circle above his home. Another witness reported hearing an "explosion" and shortly thereafter the sound of crushing or crashing metal and "tin." Another witness reported hearing an increase in the engine sound before hearing the helicopter impact the ground.

The wreckage was located in forested and rolling terrain, at GPS coordinates of 35 degrees 33.7 minutes north and 092 degrees 33.25 minutes west.

PERSONNEL INFORMATION

The pilot, age 35, held a commercial pilot certificate with airplane single engine land, rotorcraft helicopter, and instrument helicopter ratings. He also held an airline transport pilot certificate with an airplane multiengine land rating. He was issued a second-class airman medical certificate on August 25, 2010, with no limitations.

Air Evac hired the pilot, in September of 2007. According to Air Evac's records, the pilot had logged no less than 3,312 hours flight time in rotorcraft; 489 of which was in the make and model of the accident helicopter, 622 hours at night, and 311 hours under actual and simulated instrument conditions. He was a former military pilot and had logged more than 200 hours of night vision goggles (NVG) flight experience. The pilot had accumulated 35 hours in the past 90 days and 12 hours at night. The company flight records did not reflect the pilot's instrument experience within the previous 90 days. The records reflected that the pilot had accepted eleven night flights within the previous three months, five of which were aided by the use of NVG. At the time of the accident, he was the base pilot supervisor in Vilonia, Arkansas.

The pilot's airman competency/proficiency check for CFR 135.293 (Initial and recurrent pilot testing), and CFR 135.299 (Pilot in command: Line checks: Routes and Airports) was completed with a satisfactory rating in all tested areas on September 1, 2009. A company check-airman conducted the flight check in a Bell 206L helicopter in daylight conditions. The pilot had been trained for the use of night vision imaging systems (NVIS) including the NVGs. The pilot received his NVG ground training on December 7, 2009, and his NVG flight proficiency checkride on December 11, 2009. This check was completed in a Bell 206L helicopter. During this training, he received simulation in inadvertent flight into instrument meteorological conditions (IIMC).

Air Evac's records showed that the pilot's work schedule was 7 days on followed by 7 days off. He had been on the day shift (0700 to 1900) from August 12, 2010, through August 18, 2010; had seven days off, and then started duty for the night shift (1900 to 0700) on August 26, 2010. During the recent night shift rotation, the pilot had logged 2 hours and 30 minutes of flight time on the shift three days prior to the accident. This time included 0.2 hours during the day, 0.6 hours at night, and 1.7 hours while aided using NVGs.

According to Air Evac's director of safety, there were no safety issues or occurrences that involved the accident pilot.

AIRCRAFT INFORMATION

The accident helicopter, a Bell 206L-1 (serial number 45169), was manufactured in 1978. It was registered with the FAA on a standard airworthiness certificate for normal operations. A Rolls-Royce 250-C30P turboshaft engine rated at 650 shaft horsepower powered the helicopter. The helicopter was equipped with a two-blade main rotor system.

The helicopter was registered to and operated by Air Evac EMS, Inc., and was maintained under an approved aircraft inspection program. A review of the maintenance records indicated that a 150-hour inspection of the engine had been completed on August 29, 2010, at an airframe total time of 24,686.9 hours. An event two inspection was conducted on August 15, 2010, at an airframe total time of 24,664.2. The helicopter had flown 2.6 hours between the last inspection and the accident, and had a total airframe time of 24,689.5 hours.

The helicopter was equipped for flight into instrument meteorological conditions but was not Instrument Flight Rules (IFR) certified. The helicopter was equipped with a radar altimeter and a NVIS had been installed in July of 2009. The helicopter was not equipped with Helicopter Terrain Awareness Warning System (HTAWS), nor was it required to be. The helicopter was equipped with the Garmin 396, which provided terrain awareness warnings through a visual and aural warning.

METEOROLOGICAL INFORMATION

Infrared satellite imagery of Arkansas displayed clouds directly over the accident site. The images depicted a layer of low clouds and stratus prevalent from southern Missouri southward into Arkansas, Louisiana, and Mississippi. The low cloud cover and stratus increased in areal coverage over time and covered the majority of Arkansas, Louisiana, western Mississippi, and southern Missouri by 0415. Doppler weather radar did not depict precipitation returns in the area at the time of the accident.

The upper air sounding parameters indicated a moist stable environment from the surface to approximately 2,500 feet msl, which supported low clouds and stratus below 2,500 feet. The inversion at 2,000 feet also acted to increase the areal coverage of the low clouds and stratus across Arkansas. Above 2,500 feet, the atmosphere was conditionally unstable, which supported stratus and stratocumulus cloud development to 7,000 feet.

The National Weather Service (NWS) had issued AIRMET (Airman's Meteorological Information) Sierra for instrument meteorological conditions due to low ceilings and poor visibility. The Area Forecast advised of marginal visual meteorological conditions in the state of Arkansas.

The closest official weather observation station was Clinton Municipal Airport (KCCA), Clinton, Arkansas, located six nautical miles (nm) northeast of the accident site. The elevation

of the weather observation station was 514 feet msl. The routine aviation weather report (METAR) for KCCA, issued at 0355, reported, winds calm, visibility 10 miles, sky condition few clouds at 1,600 feet, broken clouds at 4,900 feet, overcast at 6,000 feet, temperature 25 degrees Celsius (C), dew point 23 degrees C, altimeter 30.09 inches.

METARs reported visibility of 5 miles in mist 1.5 hours prior to the accident. A visibility as low as 4 miles in mist was reported up to 3 hours prior to the accident.

According to the United States Naval Observatory, Astronomical Applications Department Sun and Moon Data, the sunset was recorded at 1938 and the end of civil twilight was 2004 (both on August 30). The Moon rose at 2230 (August 30), and at the time of the accident was 72 degrees above the horizon at an azimuth of 139 degrees. The phase of the Moon was waning gibbous with 60 percent of the Moon's visible disk illuminated above the clouds.

Several witnesses in the immediate vicinity of the accident location reported the weather as hazy or foggy, with overcast skies. One witness stated that it was very dark and no moon could be seen.

There was no record that the pilot obtained a weather briefing from the FAA Flight Service Station or Direct User Access Terminal System (DUATS). According to Air Evac, each base was equipped with a computer terminal, allowing the pilots to frequently check the weather. Air Evac encouraged their pilots to use Aviation Digital Data Services (ADDS), Weather Tap, and Flight Service Stations. In addition, each helicopter was equipped with XM (satellite radio) weather information. It could not be determined which resources were used by the pilot prior to the flight. The weather was not discussed with the dispatcher prior to or during the flight.

COMMUNICATIONS

Recordings of communications between Van Buren County and Air Evac 30 were provided to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) for review. The final recording, with a time stamp of 0356:32 captured one clear transmission from Air Evac. A male voice was heard to say, "Base, Air Evac three zero..." In addition, a short tone, which increased in pitch, was heard in the background. The source of the tone was not identified. The remainder of that recording contained communications between the ground unit transporting the patient and the base operator.

FLIGHT RECORDERS

The accident helicopter's Garmin GPSMAP 396 (serial number 28218729) unit was sent to the NTSB Vehicle Recorders Lab in Washington, D.C. for download. The unit sustained major damage and could not be repaired. The FLASH memory device was removed from the main printed circuit board for extraction of flight data associated with this accident. Downloaded tracklog data included date, time, latitude, longitude, and the GPS altitude. One tracklog was recovered from the unit corresponding to the accident flight.

WRECKAGE AND IMPACT INFORMATION

The accident site was located in forested, rolling terrain at an elevation of 585 feet msl. The main wreckage consisted of the instrument panel, landing skids, engine, transmission, and cabin area. The wreckage was damaged by impact forces and was charred, melted, and partially consumed by fire. A circular burn area extended north from the main wreckage. The main rotor mast was imbedded approximately three feet diagonally in the ground.

Fuselage doors came to rest west of the main wreckage. One door remained in a tree overhead and to the west of the main wreckage.

The debris field initiated at a point north of the main wreckage. The helicopter chin bubble was located 0.5 miles north of the main wreckage at an elevation of 930 feet msl. Paper manual pages from a medical manual and fragmented Plexiglas were contained within the debris field, which proceeded on a southeasterly vector, for one-half of a mile, to the main rotor assembly.

The main rotor assembly, which consisted of the main rotor hub and the main rotor blades, came to rest 715 feet northwest of the main wreckage at an elevation of 611 feet msl.

The white rotor blade remained attached to the main rotor hub and was found inverted to its normal position in flight. A portion of the main rotor tie down strap was wrapped around the white blade. A puncture hole, one inch in diameter, was noted two inches inboard from the trailing edge of the blade, 67 inches outboard from the center of the mast. A second puncture hole seven inches by three inches triangular was noted along the trailing edge strip 94 inches outboard of the center of the mast. This puncture terminated five inches from the leading edge. A tear was noted that extended from 99 inches to 115 inches from the center of the mast. This tear originated from the second puncture, extended along the spar to 115 inches, and angled up towards the trailing edge terminating at 120 inches. The white blade exhibited light scraping marks along the back of the blade at 102 inches through 108 inches and again from 130 inches to 145 inches. Two additional trailing edge tears were noted at 135 inches and 142 inches. Thirty five inches of the trailing edge strip separated partially from the white blade and was bent and twisted outboard, ending its separating at the outboard trim tab. The tip of the white blade separated in an angular direction from outboard tip to inboard.

The tie down strap bag was in a tree directly above the main rotor assembly.

The red rotor blade remained attached to the main rotor hub and was upright as it lay. A puncture hole was noted at 3 inches from the center of the mast. A circular scoring or scratch that started at 84 inches and extended to 127 inches was noted on the blade face. This scoring started at the blade tear and extended outboard. Several puncture holes were noted in the blade face with Plexiglas imbedded within.

The red pitch change link remained attached to the main rotor hub assembly.

The tail boom, which consisted of the horizontal and vertical stabilizers, tail rotor driveshaft, tail rotor gearbox, and tail rotor assembly, came to rest 190 feet southwest of the main wreckage at an elevation of 578 feet msl. The piece measured 14 feet 8 inches in length and came to rest upright. Impact damage was noted to the extreme upper and extreme lower vertical stabilizer tips. Dirt was imbedded in each damage point. An adjacent rock, three feet

south of the tail boom exhibited paint transfer consistent with the stabilizer and had a shape consistent with the damage to the stabilizer.

Both tail rotor blades remained attached. One blade was bent 35 to 40 degrees near the blade root. The other blade exhibited a crease near the blade root.

The tail rotor driveshaft was removed and examined. The shaft was continuous from the point of separation, aft through an approximate 20 degree bend at the stabilizer, through to the tail rotor blades. When rotated by hand, movement was noted in the tail rotor. The pitch change tube was continuous from the separation point aft to the tail rotor. When activated by hand, movement of the tail rotor blades was noted.

The left horizontal stabilizer end plate exhibited scratching and slight crush damage on the bottom leading edge of the winglet. A small area of blue paint transfer was found on the ground near the left horizontal end plate. The horizontal stabilizer was otherwise unremarkable.

MEDICAL AND PATHOLOGICAL INFORMATION

The Arkansas State Crime Laboratory performed the autopsy, on the pilot, on September 1, 2010, as authorized by the Van Buren County Coroner's office. The autopsy concluded that the cause of death was a result of multiple injuries and the report listed the specific injuries.

The FAA's Civil Aerospace Medical Institute, Oklahoma City, Oklahoma, performed toxicological tests on specimens that were collected during the autopsy (CAMI Reference #201000232001). The specimens received by CAMI were putrefied and the urine sample was brown and cloudy consistent with contamination. Specimens were unsuitable for carbon monoxide analysis. Results were negative for cyanide, and drugs. Testing of the muscle tissue detected 42 mg/dL Ethanol, 8 mg/dL N-Butanol, and 2 mg/dL N-Propanol. Testing of the brain tissue detected 11 mg/dL Ethanol, and 1 mg/dL Methanol. Testing of the urine detected 10 mg/dL ethanol and testing of the blood detected 1 mg/dL N-Propanol.

TESTS AND RESEARCH

The following observations were made during a wreckage examination in Clinton, Arkansas:

Main Rotor

Outboard damage to the bottom side and leading edge of the white blade was observed and coincided with contact to the left skid toe. The inboard portion of a main rotor blade tie down was found wrapped around the blade in the same area. Evidence of white blade contact with the left side of the nose was observed with parallel chordwise marks on the bottom of the blade consistent with a rivet line. The red blade had a piece of blue airframe Plexiglas wedged into the bottom of the blade.

Flight Controls

The cockpit area was damaged by fire and portions of the aluminum flight controls appeared to

have been consumed by the fire. Observed fractures in the main rotor, non-rotating flight controls (control tubes, supports, cyclic stick) were consistent with overload fractures. All three main rotor servo rods moved smoothly when the flight control tubes were manipulated by hand. One main rotor pitch change link (white blade) exhibited overload fractures. The red main rotor blade pitch change horn and pitch change link were intact and remained connected to the main rotor hub. However, the associated (red) pitch change attach ear of the rotating swash plate that attached to the bottom end of the red pitch change link had fractured and exhibited displacement associated with overload condition. The swashplate was located with the main wreckage.

Overload fractured and burned remnants of tail rotor control tubes were observed in the main fuselage. The left pilot pedal was found fractured. Control continuity in the fractured tail boom section was demonstrated when the fractured tail rotor control tube was moved and corresponding pitch change movement was observed at the tail rotor assembly. The pilot throttle received thermal damage and the throttle position was found half way between idle and full power.

Drive System

Drive continuity was demonstrated through the transmission. The main driveshaft exhibited overload related fractures at both the transmission and engine ends. The freewheeling unit was severely damage by fire. Tail rotor drive continuity was demonstrated from the forward tail boom fracture to the tail rotor assembly.

Engine

Examination of the accessory gearbox revealed the gearbox housing to have been approximately 75 percent consumed by fire, exposing the gear train as well as consuming most of the engine accessories. Several gears had fallen from their original locations, while other gears were severely damaged by impact forces. All gears were accounted for. Both magnetic chip detectors were consumed by fire. The airframe-mounted oil filter was opened and examined; it contained a small amount of oily water, no metal debris, and the filter was not in bypass mode. Boroscope examination of the compressor (N1) and power turbine (N2) revealed evidence consistent with rotational impact damage. Neither the N1 nor N2 rotor systems could be rotated by hand. There was no evidence of engine failure, fire, or malfunction prior to impact.

Instrument Panel

The following indications were observed on the instruments:

Attitude Indicator - inverted, 5 degrees bank to the right
Airspeed Indicator - 54 knots
HSI/DG - 030 degrees
VSI - unreadable
Kollsman Window - 30.50
Torque - below zero

Fuel Pressure - above zero
Transmission Temperature - 140 degrees
Transmission Pressure - zero
Oil Temperature - 120 degrees
Oil Pressure - zero
Fuel - 240 pounds
Turbine Outlet Temperature - 210 degrees
NR - off scale
N1 - 126 percent
N2 - 48 percent

Emergency Locator Transmitter

The emergency locator transmitter (ELT), an ARTEX ME 406 dual channel ELT, did not activate during the accident sequence and was found several feet west of the main wreckage. The coaxial antenna cable separated from the airframe mounted external antenna. The emergency locator transmitter was recovered from the main wreckage and later examined in Prescott, Arizona, by the NTSB IIC and engineers from Cobham Safety & Survival/Artex ELT Products. External examination revealed impact damage on one corner of the unit, a broken cap, and slight movement of the Velcro strap utilized to secure the unit to the mounting tray. Voltage was measured on the internal batteries. Internal examination revealed that the unit circuit board, resisters, and power ribbon had separated during impact.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

The FAA issued Air Evac EMS, Inc., an operating certificate in February of 1986 to conduct on demand emergency medical service transports. At the time of the accident, Air Evac conducted air ambulance operations in 14 states with 97 bases. The accident crew was based at Vilonia, Arkansas. The corporate headquarters, including training, the Director of Operations, Chief Pilot, and Director of Safety were located in West Plains, Missouri. The FAA Flight Standards District Office in Saint Louis, Missouri managed the operating certificate.

The company operated 2 different make and models of helicopters, and employed 400 pilots. Prior to employment, each pilot was required to have a minimum of 2,000 hours total time; 500 hours turbine time, and instrument and night flight experience.

Audits and Accreditations

On July 12, 2008, Air Evac EMS, Inc., was awarded full accreditation for Rotorwing operations with the Commission on Accreditation of Medical Transport Systems (CAMTS). This accreditation included the Vilonia, Arkansas, base. Their last audit was conducted in 2009. They maintained their status with CAMTS and were current at the time of the accident.

In addition to CAMTS, Air Evac, held memberships with the Association of Air Medical Services, The Association of Air Medical Operations, The American Ambulance Association, Helicopter Association International, Air Medical Safety Advisory Council, and they held a gold rating through ARGUS Health System, Inc. They belonged to over 15 different state Air Medical

Service Associations. Air Evac received audits from Starr Aviation in 2010, Aerosafe in 2009, The National Safety Council in 2008, and Hendricks and Associates in. The results of each audit were satisfactory.

ADDITIONAL INFORMATION

Pre Flight Risk Assessment

Air Evac pilots were required to use a Risk Assessment Worksheet prior to all air medical and air medical reposition flights. There were two versions of the worksheet, the short form, and the long form.

The short form had 17 areas of review. Each area was assigned a numerical point, or points, by the pilot. The area's point(s) were added into a final tally. This final numerical score was considered the flight's risk assessment. The short form areas included pilot experience with the company, pilot experience in the make and model of the helicopter, and weather and terrain for the flight. The 10 areas under weather and terrain were further broken down into a point assignment for day operations and a higher point assignment for night operations. If the total of the short form was less than 35 points, pilots were advised that the flight is at their "discretion." If the total of the short form was 35 or greater, the pilot was required to complete the long form and consult with the operational control center.

The long form had 31 areas to be reviewed and scored the same way as the short form. A score of 35 or less was low risk with the conduct of the flight being pilot's choice. A score of 35 to 60 was low to moderate risk, advising the pilot to exercise caution. A score of 61 to 99 was moderate to high risk, advising the pilot to exercise extreme caution. A score of 100 and above was high risk, and the flight was not permitted. Use of the long form and consultation with the operational control center was required for all risk levels above 34.

The risk score for the accident flight was 15, as reported by the pilot prior to the flight, which did not require the use of the long form, and did not require a consultation with the operational control center.

Air Evac Pilot Training

At the time of the accident, Air Evac conducted ground and simulator-based training with their pilots. The pilots received ground training on an annual basis, which included situational awareness, human factors, patient interaction and awareness, critical incident task saturation, workload management, risk assessment, loss of tail rotor effectiveness, weather, and weather preparedness for the day to enhance launch decision making. Additional training included all required aspects of Parts 91 and 135 as well as night operations, the FAA approved NVG curriculum, and recovery from IIMC conditions.

The pilots received simulator training every six months. This simulator training included unusual attitudes and recovery from IIMC, a PAR/ASR approach, a GPS approach, simulated white out and brown out conditions, and several emergency procedures. The emergency

procedures included engine failures, hydraulic failures, and component failures.

With the introduction of the NVG into the fleet, the pilots also received NVG flight and ground training. Flight training was conducted at night flying various maneuvers, experienced different emergency procedures, system failures, and flight into various lighting conditions. IMC conditions were simulated.

Operational Control Center

Air Evac operated one main Operational Control Center (OCC) located in West Plains, Missouri. The OCC was manned by multiple dispatchers (flight followers) performing the functions of call taking and flight following. These dispatchers were not FAA certified aircraft dispatchers; however, they were trained in emergency response. Each dispatcher worked a 12-hour shift and EMS operations at Air Evac were conducted 24 hours a day, 7 days a week.

In addition to flight followers, the OCC was staffed 24/7 with "Operational Controllers". Air Evac Operations Specifications - A008 OPERATIONAL CONTROL lists Tier 1 Operational Control: "The Operational Control Center (OCC), through the authority of the Director of Operations, and through the Chief Pilot, exercises Operational Control of company aircraft. The OCC has the authority to decline a flight request, or terminate a flight, in the interest of safety."

The Operational Controllers did not perform the duties of Flight Followers, rather their purpose was to serve as a resource, available by radio, to assist the pilot with weather, publications, and emergency information, if requested.

Each dispatch and operation controller station was equipped with a computer, several monitors, a telephone, and a radio. Each computer was equipped with software to provide updated weather information, satellite tracking of all active operations, flight details, and flight timers. Programs and software included Skytrac, Golden Hour, and HEMS Weather. Each conversation was recorded and retained for 90 days.

All calls for dispatch were made to the OCC. The dispatcher would determine which aircraft was best positioned for the mission, track base status, and would notify the crew by page/radio/telephone. Base status was determined at crew change and as the shift progressed, with changes in weather/crews.

The dispatcher would enter all applicable flight/patient information into various programs and as soon as the aircraft powered up, the Skytrac tracking was activated. Skytrac provided satellite-tracking capabilities and could provide GPS coordinates, ground speed, a pictorial depiction of aircraft location, and text communications between the aircraft and dispatch. The pilot made manual position reports every 15 minutes. If a position report was not recorded in Golden Hour, an alarm would sound, alerting the dispatcher and prompting them to follow-up with the flight status of the aircraft. Normally, the Skytrac recorded positions every 60 seconds; if an emergency was declared, the system started recording position and information every ten seconds. Once the flight had landed uneventfully, the dispatcher closed out the flight record.

Air Evac EMS Safety Actions

Following the accident, Air Evac took several steps to increase safety within their operations. At the time of the accident, the pilots were completing IIMC training every six months, which included unusual attitude recoveries while using the night vision goggles. After the accident, Air Evac placed additional focus and emphasis on IIMC training during night operations, in addition to IIMC procedures at night while using the night vision goggles.

History of Flight

Maneuvering	Unknown or undetermined (Defining event)
Enroute	VFR encounter with IMC
Enroute	Loss of control in flight

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	35,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
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 Without waivers/limitations	**Last FAA Medical Exam:**	August 25, 2010
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 1, 2009
Flight Time:	3312 hours (Total, all aircraft), 489 hours (Total, this make and model), 1904 hours (Pilot In Command, all aircraft), 35 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BELL HELICOPTER TEXTRON	**Registration:**	N62AE
Model/Series:	206L-1	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	45169
Landing Gear Type:	Skid	**Seats:**	4
Date/Type of Last Inspection:	August 29, 2010 AAIP	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	24690 Hrs at time of accident	**Engine Manufacturer:**	ALLISON
ELT:	Installed, not activated	**Engine Model/Series:**	250 SER 400HP
Registered Owner:		**Rated Power:**	400 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	KCCA,514 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	03:55 Local	**Direction from Accident Site:**	67°
Lowest Cloud Condition:	Few / 1600 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 4900 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	25°C / 23°C
Precipitation and Obscuration:			
Departure Point:	Vilonia, AR (44AR)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Crabtree, AR	**Type of Clearance:**	None
Departure Time:	03:35 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	3 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	35.561668,-92.554168

Administrative Information

Investigator In Charge (IIC):	Rodi, Jennifer
Additional Participating Persons:	TR Proven; Federal Aviation Administration; Washington, DC David McNair; Transportation Safety Board - Canada Mark Stuntzner; Bell Helicopter; Fort Worth, TX Jack Johnson; Rolls-Royce Corp; Indianapolis, IN Dave Hardin; Air Evac; West Plains, MO Mike Hemann; FAA Rotorcraft Standards Staff; Fort Worth, TX
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Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=77134

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