Aviation Investigation Final Report

Location:	SUMNER, Georgia	**Accident Number:**	ATL00FA069
Date & Time:	July 24, 2000, 02:30 Local	**Registration:**	N911AM
Aircraft:	Eurocopter AS350B	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The flight was returning to the Worth County Baptist Hospital in Sylvester, Georgia. At approximately 0227, the pilot contacted the LifeFlight dispatcher and reported a Global Position System (GPS) location 7 miles west/northwest of Tifton, Georgia. No further communication was received from the pilot. Witnesses in the sparsely populated local area stated that it was a dark night and at about 0230 they heard the helicopter fly over their homes. They said the sky was clear of clouds and that the helicopter was low, maybe 400 to 500 feet above the ground. One witness stated that he watched the helicopter fly until out of site then heard a "pop sound" he said it sounded unusual and was not very loud. The flight failed to arrive at its final destination of Sylvester, Georgia. Examination of the wreckage found it localized in a heavily wooded area, with the skids buried in the ground with the trailing ends protruding upward at about a 70-degree angle. No pre-existing airframe or engine malfunctions were identified during the post crash examination.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot experienced spatial disorientation, which resulted in a loss of control of the helicopter. Contributing factors was the dark night.

Findings

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

Findings
1. (F) OBJECT - TREE(S)
2. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
3. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND
4. (F) LIGHT CONDITION - DARK NIGHT

Factual Information

HISTORY OF FLIGHT

On July 24, 2000, about 0230 eastern daylight time, a Eurocopter AS350B, N911AM, registered to and operated by Critical Care Medflight, was destroyed when it collided with trees and the ground during cruise flight 2 miles east of Sumner, Georgia. The commercial pilot, one flight nurse and one flight paramedic were fatally injured. Night visual meteorological conditions prevailed, and a company visual flight rules flight plan was filed for the repositioning flight being conducted under Title 14 CFR Part 91. The flight originated from Savannah, Georgia, at 0100, with an intended destination of Sylvester, Georgia.

According to the operator, the purpose of the air medical flight operating as LifeFlight 3 was to transport a patient from Coffee County Hospital in Douglas, Georgia, to St. Joseph's Hospital in Savannah, Georgia. After dropping off the patient, the flight was returning to the Worth County Baptist Hospital in Sylvester. At approximately 0227, the pilot contacted the LifeFlight dispatcher and reported a Global Position System (GPS) location 7 miles west/northwest of Tifton, Georgia. No further communication was received from the pilot.

Witnesses in the sparsely populated local area stated that at about 0230 they heard the helicopter fly over their homes. They said that it was a dark night, the sky was clear of clouds and that the helicopter was low, maybe 400 to 500 feet above the ground. One witness stated that he watched the helicopter fly until out of site then heard a "pop sound" he said it sounded unusual and was not very loud. He woke the next morning and found out about the accident and reported to the local police what he had observed.

The flight failed to arrive at its final destination of Sylvester, Georgia. A search was initiated, and the helicopter was located at 0850, 2 miles east of Sumner, Georgia, by a pilot over flying the area. The helicopter collided with trees and came to rest in a swampy, wooded area adjacent to a cotton field.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate for helicopters and in single engine land airplanes, with airplane and helicopter instrument ratings. He also held a flight instructor certificate in helicopters, and an advanced instrument ground instructor certificate. In addition, he possessed a second-class airman medical certificate, dated July 23, 1999, with no waivers or limitations.

According to company records, Critical Care Medflight hired the pilot on May 11, 2000. The pilot possessed a total of 2,500 hours, 2,280 of which were in helicopters. He had flown 40

hours in the previous 90 days, and 3 hours in the previous 24 hours. His last FAR 61.56 flight review was accomplished on May 5, 2000, in a Eurocopter AS350B.

AIRCRAFT INFORMATION

The 1980 Eurocopter, AS350B, N911AM, was configured as a medical flight for one pilot and three passengers. The single engine helicopter was owned and operated by C.C. Medflight, Incorporated in Wilmington, Delaware, and operated in Lawrenceville, Georgia. A review of the helicopters logbooks found that on June 7, 2000, the helicopter received an annual and 100 hour inspection with no major discrepancies noted. At the time of the accident the helicopter had accumulated 25 hours of flight time since that inspection.

METEOROLOGICAL INFORMATION

At 0230, weather conditions in Albany, Georgia, located 27 miles to the west, were reported as scattered clouds at 7,500 feet, visibility 7 statute miles, temperature 23 degrees C. (73 degrees F.), dew point 22 degrees C. (72 degrees F.), winds from 150 degrees at 4 knots, and an altimeter setting of 29.93 Hg.

COMMUNICATIONS

At approximately 0227, the pilot contacted the Life-Flight dispatcher and reported a Global Position System (GPS) location 7 miles west/northwest of Tifton, Georgia. No further communication was received from the pilot.

WRECKAGE AND IMPACT INFORMATION

The helicopter impacted the ground on a 330-degree heading. The cabin had separated toward the right side with the right hand forward cross tube mount sliding approximately half the distance from its normal position toward the skid. The forward ends of both skids were buried in the ground with the trailing ends of the skids protruding upward at approximately a 70-degree angle. Impact and the subsequent post-crash fire destroyed the cabin structure. The cockpit and right side of the cabin were thrown to the right of the impact site on a 040-degree heading over a distance of about 150 feet. Flight instruments were found separated from the instrument panel and destroyed. The pilots collective control was found and the stainless steel slide for the friction lock showed that the collective stick was at the maximum pitch setting.

The engine, rotor head and mast, and main gearbox were located in a four-foot deep hole in the approximate correct orientation consistent to the nose of the aircraft as defined by the location of the skids. The tailboom was impaled by the left aft skid spring steel extension. The aft end of the tailboom, vertical fin, tail rotor gearbox, and right horizontal stabilizer were broken away from the tailboom, but located in the general vicinity of the above described wreckage.

Examination of the main rotor shaft, head, and cyclic system remained virtually intact. The swashplate bearing appeared to be functional and could be rotated by hand. The anti-vibrator assembly was ejected from the shaft but remained approximately 10 to 12 inches forward of the rotor head; the attachment bolts were sheared and remained in the threads. The anti-vibrator assembly upper cowling was dented consistent with impact with a solid object. All main rotor blades were intact except that one blade was broken approximately half in length out in flap; there were no impact marks in the leading edge. One main rotor blade appeared to have a leading edge impact at the 1000-mm zone, but with low inertia or with something soft, as the blade remained intact except for trailing edge damage. All three starflex arms were broken in a 45-degree angle from inboard leading edge to outboard trailing edge. The frequency adapters, spherical thrust bearings, and sleeves were all intact except the yellow sleeves were stretched consistent with the impact at the frequency adapter. One pitch change link remained intact, but severely bent; the other two were broken and melted with the rod ends remaining at the attachment points in the blade horns and swashplate. Wood splinters were found in the anti-vibrator assembly and the yellow frequency adapter area. The tail rotor gearbox and rotor assembly appeared to be intact. Continuity was assured through the tail gearbox and rotor by rotating the gearbox by hand. The tail rotor pitch links remained intact with no apparent damage to the bearings or links. The tail rotor spider bearing was rotated by hand and appeared to function correctly. The tail rotor driveshaft evidenced no indication of rotation during the crash sequence. No pre-existing impact damage was identified during the examination.

Examination of the engine found it deformed by impact with some parts missing either by the impact or post-crash fire. Missing parts included the bleed valve and start drain valve. The fuel control/governor was only attached by the fuel and airlines. The front case was broken with some of the gearing exposed. The input shaft was broken approximately 2/3 of the distance from the engine toward the main gearbox. After cutting away the case, the aft flex coupling for the input shaft was found to be in good condition. The inlet for the compressor was deformed with the compressor blades bent in two different directions. The tail pipe was severely deformed and was cut away to gain access. The power output coupling had scribe marks installed during assembly of the engine as a reference for over-torque/impact evidence. The marks were found to be misaligned by approximately 1/4 of an inch forcing the gear tighter. The boss around the drive splines was deformed as well. The small coupling area of the power turbine wheel that could be seen through the areas of the tailpipe did not reveal any damage. Very little rotation marks were evident around the turbine wheel.

The engine was crated and sent to Turbomeca Engine Corporation in Grand Prairie, Texas, for further examination. On August 29, 2000, the engine was disassembled and inspected. Present during the examination were representatives from the NTSB, FAA, Critical Care Med-flight, Turbomeca and American Eurocopter. Examination and disassemble of the heavily damaged engine found circular rubs on most of the engines rotating parts, and the twisted power shaft, the fractured/opened muff-coupling and the rotation of the drive pinion into the tightened direction.

MEDICAL AND PATHOLOGICAL INFORMATION

The Georgia Bureau of Investigation Division of Forensic Sciences, in Decatur, Georgia, conducted a post-mortem examination of the pilot. The FAA Toxicology Research Laboratory, in Oklahoma City, Oklahoma, conducted a toxicology examination of the pilot. The examination revealed the following results; Carbon Monoxide Not Performed, Cyanide not performed, Ethanol >>19 Detected in Vitreous, Non-detected in the muscle, >>21 detected in kidney, >>1 N-Propanol detected in Vitreous, >>2 N-Propanol detected in kidney, and >>8 Acetaldehyde detected in kidney. Additionally, the FAA Toxicology Laboratory reported that some of the samples had Putrefaction.

In its investigations, the NTSB routinely requests complete toxicology evaluation on all transportation operators who are fatally injured. In around 10% of such evaluations, ethanol is detected in the blood and/or tissues. In many of these cases, particularly when significant decomposition has taken place, the ethanol present is the result of production of alcohol by microorganisms in the tissues after death, and does not represent the ingestion of alcohol. From the time of the accident until the time of the autopsy approximately 36 hours had passed, allowing sufficient time for microorganisms to enter the tissue.

TEST AND RESEARCH

Advisory Circular 60-4 states in part, "The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references with the surface. If neither horizon or surface reference exist, the attitude of an aircraft must be determined by artificial means from the flight instruments. Sight supported by other senses, allow the pilot to maintain orientation. However during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of orientation may vary considerably with individual pilots. Spatial disorientation to a pilot means simply the inability to tell which way is "up..." Surface references and the natural horizon may at times become obscured, although visibility may be above flight rule minimums. Lack of natural horizon or such reference is common on overwater flights, at night, and specially at night in extremely sparsely populated areas, or in low visibility conditions... The disoriented pilot may place the aircraft in a dangerous attitude... Therefore, the use of flight instruments is essential to maintain proper attitude when encountering any of the elements which may result in spatial disorientation."

ADDITIONAL INFORMATION

In addition to the Federal Aviation Administration, parties to the investigation were American Eurocopter and Turbomeca engines.

The helicopter was released to Phil Powell, Atlanta, Georgia, representing the owners insurance company.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	30,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	July 23, 1999
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	2500 hours (Total, all aircraft), 1800 hours (Pilot In Command, all aircraft), 40 hours (Last 90 days, all aircraft), 12 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Eurocopter	**Registration:**	N911AM
Model/Series:	AS350B AS350B	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1319
Landing Gear Type:	Skid	**Seats:**	4
Date/Type of Last Inspection:	June 7, 2000 100 hour	**Certified Max Gross Wt.:**	4300 lbs
Time Since Last Inspection:	25 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	4814 Hrs	**Engine Manufacturer:**	Turbomeca
ELT:	Installed	**Engine Model/Series:**	ARRIEL 1B
Registered Owner:	C.C. MEDFLIGHT, INC.	**Rated Power:**	517 Horsepower
Operator:	CRITICAL CARE MEDFLIGHT, INC.	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	LIFEFLIGHT	**Operator Designator Code:**	MFGA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	ABY ,197 ft msl	**Distance from Accident Site:**	27 Nautical Miles
Observation Time:	02:30 Local	**Direction from Accident Site:**	280°
Lowest Cloud Condition:	Scattered / 7500 ft AGL	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	73°C / 72°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	SAVANNAH , GA (SAV)	**Type of Flight Plan Filed:**	Company VFR
Destination:	SYLVESTER , GA (SYV)	**Type of Clearance:**	None
Departure Time:	01:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	3 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	31.509088,-83.739593(est)

Administrative Information

Investigator In Charge (IIC):	Wilson, Butch
Additional Participating Persons:	RAY BELCHER; ATLANTA , GA
Original Publish Date:	December 4, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=49795