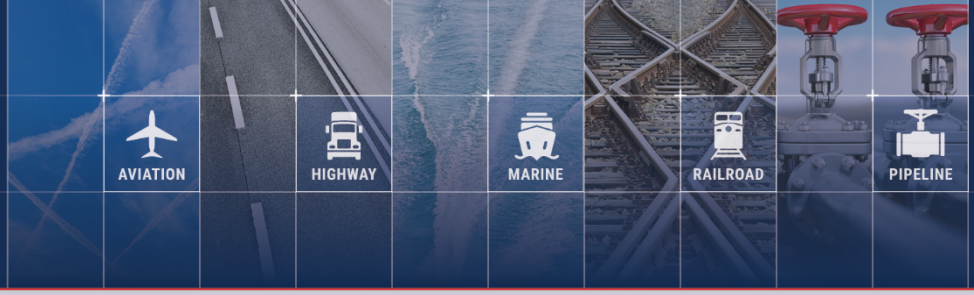

Aviation Investigation Factual Report

Location:	Vonore, Tennessee	**Accident Number:**	ERA14FA163
Date & Time:	March 23, 2014, 13:30 Local	**Registration:**	N540FM
Aircraft:	DEHAVILLAND DHC-1	**Aircraft Damage:**	Substantial
Defining Event:	VFR encounter with IMC	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

On March 23, 2014, about 1330 eastern daylight time (EDT), a Dehavilland DHC-1, N540FM, impacted mountainous terrain near Vonore, Tennessee. The airline transport pilot was fatally injured and the airplane sustained substantial damage. The airplane was operated by the pilot. Day, visual meteorological conditions prevailed for the personal flight, and no flight plan was filed. The flight originated from French Lick Municipal Airport (FRH), French Lick, Indiana, and was destined for Franklin County Airport (18A), Canon, Georgia.

On the morning of the accident, at 0639, the pilot telephoned Lockheed Martin Flight Service and requested a visual flight rules weather briefing from Watertown, Wisconsin to Augusta, Georgia, for altitudes between 3,000 and 6,000 feet above mean sea level (msl). The briefer responded that there was "…a lot of weather…" and also reported that, from southern Kentucky to his destination, there was "some uh severe weather going there." Regarding instrument flight conditions, the briefer told the pilot that visual flight rules (VFR) flight was not recommended from southern Kentucky through Tennessee and into north Georgia. He also stated that there was an Airmet for mountain obscuration for the same portion of his flight until 1400. Toward the conclusion of the briefing, the pilot responded to the briefer, "Looks like I'm probably only gonna get get down to Kentucky and spend the night."

According to personnel at FRH, the pilot landed at FRH about 1039 and purchased 30.8 gallons of 100 low lead aviation gasoline. The flight departed FRH at 1209. When the pilot did not arrive at his destination, a Federal Aviation Administration Alert Notice (ALNOT) was issued. The wreckage was located during the morning of March 24, 2014. The wreckage was found on the side of a mountainous slope within the boundary of the Cherokee National Forest in Tennessee, at coordinates 35.465833, -84.010278. The elevation at the accident site was about 2,222 feet msl and about 100 feet below a ridgeline. There were no known witnesses to the accident.

Pilot Information

Certificate:	Airline transport; Flight engineer	**Age:**	59
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	None	**Restraint Used:**	5-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	November 4, 2013
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 15, 2014
Flight Time:	16000 hours (Total, all aircraft)		

The pilot, age 59, held an airline transport pilot certificate with ratings for airplane multi-engine land, airplane single engine land, and flight engineer. He possessed an FAA class I medical certificate dated

November 4, 2013. He reported 16,000 hours total flight time including 500 hours in the last six months prior to his latest medical certificate application. He was required to have glasses available for near vision.

On May 16, 2011, the pilot was arrested for driving under the influence (DUI) of alcohol with a portable breath test alcohol level of 0.126%. According to the FAA, this was the pilot's only alcohol conviction with no evidence of alcohol dependence or abuse and the pilot was found eligible for medical certification. He was cautioned that further alcohol offenses or evidence of alcohol abuse may require re-evaluation of his medical certification.

According to FAA registration records, the pilot purchased the airplane in July, 1991. A pilot logbook was found within the wreckage. The first entry in the logbook was October, 2006 and his flights in the accident airplane continued in a consistent manner until the last entry, dated March 11, 2014. According to the logbook notations, many of the flights in the accident airplane were for cross county, airshows, and airshow practice.

At the time of the accident, the pilot was employed as a chief pilot for Delta Air Lines.

Aircraft and Owner/Operator Information

Aircraft Make:	DEHAVILLAND	**Registration:**	N540FM
Model/Series:	DHC-1	**Aircraft Category:**	Airplane
Year of Manufacture:	1947	**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	189
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	March 1, 2014 Annual	**Certified Max Gross Wt.:**	2099 lbs
Time Since Last Inspection:	6 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3609 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed	**Engine Model/Series:**	IO-540-D4A5
Registered Owner:	MARONEY JAMES L	**Rated Power:**	260 Horsepower
Operator:	MARONEY JAMES L	**Operating Certificate(s) Held:**	None

The low wing, tailwheel landing gear, tandem cockpit airplane was a Dehavilland model DHC-1 (Super Chipmunk) that was manufactured in 1947. It was powered by a Lycoming IO-540-D4A5 engine, rated at 260 horsepower and was equipped with a Whirl Wind 400C three-bladed constant speed propeller. The maintenance logbook noted the engine serial number as "EXPERIMENTAL." The airplane was not certified for flight under instrument flight rules.

The tachometer time recorded at the accident site was 1859.0 hours, which corresponded to a total aircraft time of 3,609.7 hours. The last annual inspection on the airframe, engine, and propeller occurred on March 1, 2014 at an airframe total time of 3,603.6 hours.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Unknown	**Condition of Light:**	Day
Observation Facility, Elevation:	TYS,981 ft msl	**Distance from Accident Site:**	20 Nautical Miles
Observation Time:	13:36 Local	**Direction from Accident Site:**	3°
Lowest Cloud Condition:	Scattered / 1900 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 2800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots / None	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	10°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	French Lick, IN (FRH)	**Type of Flight Plan Filed:**	None
Destination:	Canon, GA (18A)	**Type of Clearance:**	None
Departure Time:	12:09 Local	**Type of Airspace:**	

The closest weather observation facility to the accident site was McGhee Tyson Airport (TYS), Alcoa, Tennessee, located about 20 nautical miles north of the accident site. The airport elevation was about 981 feet msl.

The TYS 1324 surface weather observation (about 6 minutes prior to the accident) included scattered clouds at 1,700 feet AGL, ceiling broken at 5,000 feet, wind variable at 5 knots, visibility 10 statute miles or greater, temperature 9°Celcius (C), dew point 5°C, and altimeter setting 30.13 inches of mercury.

The TYS 1336 surface weather observation (about 6 minutes after to the accident) included a scattered clouds at 1,900 feet AGL, ceiling broken at 2,800 feet, ceiling broken at 5,000 feet, wind from 320 degrees at 5 knots, visibility 10 statute miles or greater, temperature 10°C, dew point 4°C, and altimeter setting 30.13 inches of mercury.

A local area resident reported that he was in Robbinsville, North Carolina during the afternoon of the accident. Robbinsville was located about 13 nautical miles southeast of the accident site. When asked about the weather conditions, he recalled that the weather was "bad" that afternoon. He stated that there was heavy fog and it was raining in the mountains. These conditions prevailed until about 1530 to 1600 on March 23. The tops of the mountains were not visible during that time.

A staff meteorologist with the NTSB examined the weather conditions around and including the accident site. He reported the following. Visible satellite imagery from 1345 identified a band of overcast cloud cover stretching along a portion of the Tennessee-North Carolina border that included the accident site. Infrared imagery indicated cloud top temperatures for this band in the area of the accident location were approximately -1°C. When considering a North American Mesoscale (NAM) model sounding for 1400 EDT above the accident location, this temperature probably corresponded to cloud top height of about 5,400 feet above msl, which is consistent with the moisture profile depicted in the

NAM sounding. It should be noted, however, that due to the presence of a temperature inversion above this level, -1°C also corresponded to a level of 7,800 feet above msl, although the NAM sounding profile does not support clouds at this height.

The NAM model sounding identified a saturated layer centered at 3,400 feet above msl, and analysis by the Rawinsonde Observation Program suggested a broken cloud layer existed as low as about 2,650 feet above msl. Regional weather radars could not "see" low enough to capture precipitation conditions near the surface at the accident location. There were no pilot reports publically available at altitudes of 8,000 feet above msl or lower for the accident region in Tennessee or North Carolina.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	35.465831,-84.010276

The wreckage was found upright, and the debris path was oriented on a heading of about 300 degrees. Damage to broken trees within the wreckage debris path was indicative of a near-level aircraft attitude at impact. There was no evidence of fire noted. The engine controls were found in the "full forward" positions. All major structural components were found within the area of the main wreckage. The pilot was found strapped into the rear cockpit seat and was wearing a parachute at the time of the accident; it was not deployed.

The wreckage was recovered to a storage facility at Springfield, Tennessee for examination. The empennage remained attached to the fuselage. The left and right horizontal stabilizers were cut from the airframe by recovery personnel. The leading edges of the horizontal stabilizers exhibited leading edge damage and crush in the aft direction. The elevators remained attached to the stabilizers. The rudder remained attached to the vertical stabilizer and the assembly was cut from the airframe by recovery personnel. Control cable continuity was established from the elevator and rudder to the cockpit controls.

The both wings were crushed in a forward-to-aft direction from impact forces. The leading edges exhibited signatures consistent with impact with trees in a near horizontal attitude. The outboard sections of both wings were severed; however, all structural components were accounted for. The outboard sections of both ailerons remained attached to the outboard wing sections. Both wing flaps were accounted for. Due to a general fragmentation of the wings, aileron control continuity could not be established to the cockpit controls. All recovered aileron cable sections were either attached to their control surfaces, broken with overstress signatures, or cut by recovery personnel.

Both wing fuel tanks were ruptured and no residual fuel was found. Both fuel tank caps were secure.

The engine was rotated manually by turning the propeller. Continuity of the crankshaft to the rear gears

and to the valve train was confirmed. Compression and suction were observed on all six cylinders. No indication of pre-impact anomaly or malfunction of the engine was observed. A label reading "Poplar Grove Airmotive" was affixed to the top of one of the crankcase halves. A Lycoming Engines data plate was not affixed to the engine.

The propeller remained attached to the engine. The propeller spinner was crushed and partially separated from the propeller. Investigators marked the propeller blades "A," "B," and "C" to facilitate their examination. The propeller blade marked "C" was splintered and broken off at about 2/3 span. The blade marked "B" was splintered and broken off at about 1/2 span. The blade marked "A" was splintered beginning near the hub and broken off about 10 inches outboard of the hub. The propeller governor remained attached to the engine and the propeller governor control cable remained attached to the governor control arm. The arm was observed near the full increase rpm position. The governor was removed from the engine and the oil screen was found unobstructed.

The fuel injector servo was fractured across the throttle bore and separated from the engine. The induction air box was crushed. The throttle, mixture, and alternate air controls were separated and their pre-impact positions could not be determined. The fuel regulator section was disassembled and no damage to the diaphragms and internal components was noted. The servo fuel inlet screen was absent of debris. The fuel flow divider remained attached to the engine and no damage was noted. It was removed and disassembled. No damage to the diaphragm or internal components was noted. The fuel injector nozzles were removed and observed to be unobstructed. The engine driven fuel pump remained attached to the engine and was impact damaged. It was removed and disassembled. No damage to the diaphragms or valves was noted.

The spark plug electrodes exhibited gray coloration and normal wear as compared to a Champion inspection chart. The #2 bottom spark plug was impact-damaged.

Oil was observed inside the engine. The oil suction screen was removed and was observed to be absent of debris. The oil filter was impact damaged and was not examined. The oil cooler and oil cooler hoses remained attached to the engine. The oil cooler exhibited impact damage.

Medical and Pathological Information

A postmortem examination of the pilot was performed at the Office of the Medical Examiner, Regional Forensic Center, at The University of Tennessee, Knoxville, Tennessee on March 25, 2014. The autopsy report noted the cause of death as "Multiple blunt force injuries."

Forensic toxicology testing was performed on specimens of the pilot by the Federal Aviation Administration (FAA) Bioaeronautical Sciences Research Laboratory (CAMI), Oklahoma City, Oklahoma. The CAMI toxicology report indicated negative for carbon monoxide, ethanol, and drugs. Testing for cyanide was not performed.

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	David Alderman; FAA/FSDO; Nashville, TN James Childers; Lycoming Engines; Williamsport, PA
Report Date:	January 13, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=88957

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.