Aviation Investigation Final Report

Location:	Cumming, Georgia	**Accident Number:**	ERA12FA561
Date & Time:	September 13, 2012, 19:41 Local	**Registration:**	N517DG
Aircraft:	HALL DON H RV-7	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

This report was modified on June 4, 2013. Please see the docket for this accident to view the original report.

Witnesses observed the airplane maneuvering in the area before the accident. One witness reported seeing the airplane spin “wing to wing down” before it disappeared behind trees. The airplane impacted terrain in an upright, nose-low attitude in a residential area. Examination of the wreckage revealed no evidence of a preexisting mechanical malfunction or failure of the airframe or engine that would have precluded normal operation. Recorded engine and performance parameters revealed that the pilot reduced power and slowed the airplane while above 3,000 feet indicated altitude. Subsequently, the airplane began an uncontrolled descent. Engine performance indications were increasing during the seconds before impact. It is likely that when the pilot reduced engine power, the airspeed dropped below stall speed, which resulted in an aerodynamic stall.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot’s failure to maintain airspeed while maneuvering, resulting in an aerodynamic stall and collision with terrain.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Maneuvering	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On September 13, 2012, about 1941 eastern daylight time, a Vans RV-7, N517DG, was substantially damaged following a collision with terrain at Cumming, Georgia. The private pilot and one passenger were fatally injured. The airplane was registered to a corporation and was operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day, visual meteorological conditions prevailed and no flight plan was filed. The local flight originated at Stoney Point Airfield (6GA0), Cumming, Georgia, about 1927.

A review of recorded radar data revealed that the airplane departed 6GA0 and proceeded to the northwest. About three minutes into the flight, a “figure 8” pattern was flown as the airplane climbed to about 2,000 feet above mean sea level (msl). The airplane then proceeded in an east-southeasterly direction for about 9 nautical miles (nm) before crossing the shoreline of Lake Lanier. The airplane then turned south-southwest and proceeded about 6 nm before commencing a left turn to the north. The aircraft reached a peak altitude of about 4,200 feet msl about 7 miles south of the accident site. While continuing in a northerly direction, the airplane descended from 3,500 feet at 19:39:57 (HH:MM:SS) to 1,600 feet at 19:40:57 (the last recorded radar return).

Witness observed the airplane maneuvering in the area prior to the accident. Several witnesses reported variations in engine noise shortly before the sound of the ground impact. Another witness reported that the pilot appeared to be performing an aerobatic maneuver prior to the crash. He also stated that the airplane "spun wing to wing down" and disappeared behind trees.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with ratings for airplane single-engine land, airplane multiengine land, and instrument airplane. He reported a total flight experience of 730 hours on his latest third-class medical certificate application, dated January 5, 2011.

A review of the pilot’s most recent personal logbook revealed a total logged flight time of about 784 hours, including about 660 hours as pilot-in-command.

AIRCRAFT INFORMATION

The airplane was a single engine, low wing, fixed tail wheel airplane, serial number 72314. It was powered by an experimental Aero Sport Power Ltd. IO-360-B1B engine rated at 180 horsepower at 2,700 rpm.
According to the aircraft maintenance records, the last condition inspection on the airframe and engine was performed on April 8, 2012, at a total aircraft time of 230.5 hours.
The pilot was the listed builder of the airplane and was a certificated experimental aircraft builder.

METEOROLOGICAL INFORMATION

The 1953 surface weather observation for Dekalb-Peachtree Airport (PDK), Atlanta, Georgia, located about 23 miles southwest of the accident site, reported wind from 100 degrees at 3 knots, visibility 10 miles or better, sky clear, temperature 23 degrees C, dew point 14 degrees C, and altimeter setting 30.23 inches of mercury (inHg).

WRECKAGE AND IMPACT INFORMATION

The wreckage was found upright, on a heading of 360 degrees. All structural components of the airframe were accounted for at the accident site. There was no fire. Other than the area of initial ground impact, there was no linear ground scar. The engine propeller separated at the crankshaft and was partially embedded in the ground. One propeller blade exhibited blade twisting, a forward bend, leading edge damage, and chord-wise surface scratches.

Flight control continuity was established from the ailerons and rudder to the cockpit controls. Elevator continuity was established with the exception of an elevator control tie rod connection, which was fractured and exhibited signatures consistent with bending overload.

The engine mixture and propeller controls were found in the forward positions and the throttle was found in the retarded position. Both fuel tanks were breached and there was evidence of spilled fuel under the wreckage.

The engine was removed from the firewall and examined at the accident site. All rocker covers and spark plugs were removed. The spark plugs displayed an extended service life and a color consistent with normal combustion when compared to a Champion Spark Plug wear guide. The engine was manually rotated; suction and compression were observed on all cylinders. The valve rocker arms were observed rotating in a normal manner. The accessory gears were observed rotating. All cylinders were examined using a lighted bore scope; no defects were observed. The fuel injector nozzles were clear and unobstructed. Nothing was observed during the course of the examination that would have precluded the engine from making rated power prior to impact.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was performed by the Georgia Bureau of Investigation, Division of Forensic Sciences, on September 14, 2012. The autopsy report noted the cause of death as “Blunt force trauma of head, torso, and extremities.” The manner of death was “Accident.”

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, cyanide, and ethanol. Naproxen was detected in the urine. Naproxen (Naprosyn®, Anaprox®, Aleve®) is an over-the-counter Non Steroidal Anti-Inflammatory Drug (NSAID). It is used as an anti-inflammatory medication to treat aches and pains, as an antipyretic to reduce fever.

TESTS AND RESEARCH

The aircraft was equipped with an Advanced Flight Systems Inc. AF-3500EE multifunction display that presented the pilot with aircraft attitude, altitude, heading, navigation, moving map, airway and approach databases. The EE designation indicated that the unit also had engine monitoring and fuel status capabilities. The AS-3500EE could record dynamic flight information on an internal flash non-volatile memory at a pilot selectable interval. The unit recorded approximately 51 discrete data parameters to the internal non-volatile memory.

The unit was forwarded to the NTSB Vehicle Recorders Laboratory in Washington, DC for hardware inspection and data readout.

The time in the AF-3500EE was set by the operator, and maintained by an internal lithium-ion battery between power cycles. When connected to another Advanced Flight Systems Inc. device, discrete data parameters were shared and recorded, except for time.

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained minor impact damage. An internal examination revealed no significant damage. External power was applied to the unit and information was extracted normally, without difficulty.

The unit contained 266 data points between September 5, 2012 and September 13, 2012. The date and time accuracy could not be verified since the clock was set by the operator.

The data revealed that the aircraft departed 6GA0 and followed a flight path consistent with the radar track described in the “History of Flight” section of this report. Times stated in the following paragraphs were estimated by comparing the AF-3500EE flight track to the ATC radar data. The times recorded on the AF-3500EE were about 26:48 (MM:SS) earlier than radar data.

At about 19:37:54, the manifold pressure decreased from 26 inHg to about 11 inHg, coincident with a reduction in fuel flow and reduction in airspeed. The altitude began to decrease at about

19:38:18, and continued to decrease until the end of the recording. About 19:39:09, the manifold pressure further reduced, and the oil pressure began to reduce from 72 psi to about 55 psi by about 1940.

About 23 seconds before the end of the recording, the manifold pressure, fuel flow, oil pressure, and airspeed increased. During this 23 second period, the altitude decreased from 3,030 feet to a last recorded value of 1,290 feet at 19:40:57.

Additional engine parameters showed that, about 19:38:06, exhaust gas temperature (EGT) values increased for about 1 minute. After 19:38:06, cylinder head temperature (CHT) decreased until 19:40:46, when CHT started to increase along with the manifold pressure and fuel flow until the end of the recording.

A review of recorded airspeed data revealed that, about 19:39:09, the airplane was at 101 knots at 3,760 feet indicated altitude. The airspeed then gradually decreased until 19:40:41, when the airplane was at 59 knots and 2,920 feet. Airspeed then increased, reaching 119 knots at 19:40:51. The airplane also descended to 1,990 feet at that time. The last recorded airspeed parameter was at 19:40:57, when the airplane was at 81 knots and 1,290 feet.

Pilot Information

Certificate:	Private	**Age:**	45,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	January 5, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 784 hours (Total, all aircraft), 660 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	HALL DON H	**Registration:**	N517DG
Model/Series:	RV-7	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	72314
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	April 8, 2012 Condition	**Certified Max Gross Wt.:**	1800 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	230 Hrs as of last inspection	**Engine Manufacturer:**	Aero Sport Power Ltd
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360-B1B
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PDK,1003 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	17:53 Local	**Direction from Accident Site:**	210°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	100°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.22 inches Hg	**Temperature/Dew Point:**	23°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Cumming, GA (6GA0)	**Type of Flight Plan Filed:**	None
Destination:	Cumming, GA	**Type of Clearance:**	None
Departure Time:	19:27 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	34.210277,-84.050277

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Scott Marshall; FAA/FSDO; Atlanta, GA James Childers; Lycoming Engines; Williamsport, PA
Original Publish Date:	May 30, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=85028