Aviation Investigation Final Report

Location:	Hedgesville, West Virginia	**Accident Number:**	ERA12FA006
Date & Time:	October 5, 2011, 17:38 Local	**Registration:**	N747HW
Aircraft:	HARRY L. WEBER ARION LI	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Several witnesses reported that, shortly after takeoff, when the airplane was about 15 feet above ground level, it suddenly pitched up about 45 degrees, stalled, and then came to rest against a residence near the turf runway. GPS data were consistent with the witness reports. Examination of the airframe and engine revealed no mechanical malfunctions or abnormalities that would have precluded normal operation.

The pilot's medical records revealed that he had hypertension and a pacemaker, and that, about 8 months before the accident, the pacemaker was upgraded to a combination pacemaker/Automatic Internal Cardiac Defibrillator (AICD). Medical records revealed that the pilot was using medications to treat hypertension, moderate-to-severe congestive heart failure, recurrent ventricular arrhythmias, and atrial fibrillation. Toxicology testing confirmed the presence of such medications in the pilot's body. Given the postmortem examination, reported medication use, and the upgrade to a pacemaker/AICD, it is likely that the pilot had experienced a serious arrhythmia and severe congestive heart failure some time before the accident. Although the exact degree of premortem cardiac dysfunction could not be determined, the presence of the AICD indicated that the pilot's doctors had identified a significantly elevated risk of sudden cardiac death. Although an AICD reduces the risk of sudden death from tachyarrhythmia, it does not reduce the risk of a sudden death from other cardiac-related causes. Federal regulations only require a valid driver's license to exercise the privileges of a sport pilot certificate in a light-sport aircraft as long as pilots are not aware of any medical condition that would make them unable to operate a light-sport aircraft safely. However, the pilot most likely did not have sufficient knowledge to accurately assess the aviation safety risks associated with his condition. It is likely that the pilot's underlying cardiac disease caused an acute medical event, which led to his loss of control of the airplane and the subsequent aerodynamic stall at low altitude and collision with terrain.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

An aerodynamic stall at low altitude due to the pilot's acute cardiac event.

Findings

Personnel issues	Cardiovascular - Pilot
Aircraft	Pitch control - Capability exceeded

Factual Information

History of Flight

Initial climb	Aerodynamic stall/spin
Initial climb	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On October 5, 2011, at 1738 eastern daylight time, an experimental amateur-built Arion LI, N747HW, was substantially damaged when it impacted a house near Hedgesville, West Virginia. The airplane had departed from the Green Landings Airport (WV22), Hedgesville, West Virginia, just prior to the accident. Day visual metrological conditions prevailed and no flight plan had been filed. The airline transport pilot was fatally injured. The personal local flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

According to several eyewitnesses, the pilot had been assembling the airplane since January 2011. The first flight in the airplane had taken place on October 3, 2011, and the pilot was attempting to acquire the 40 flight hours required in order to fly the airplane to his residence in Danbury, Connecticut. Several witnesses reported that shortly after takeoff, approximately 15 feet above ground level, the airplane pitched up to a 45 to 60 degree nose up attitude and then appeared to have stalled just prior to impacting the house.

According to an internet forum entry dated Monday, October 3, 2011, at 3:41 pm, it stated in part "first flight of the lightning N747HW today in West Virginia after 7 months building. Everything went as planned with no abnormal flight characteristics and smooth running engine... This is my second kit. First was a Glasair III and took 7 years to complete. Looking forward to many happy hours of flying. I will fly it to Connecticut after the 40 hours test phase."

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	70
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):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	December 4, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 21811 hours (Total, all aircraft), 3 hours (Total, this make and model)		

According to Federal Aviation Administration (FAA) records, the pilot, age 70, held an airline transport pilot certificate with a rating for multiengine land with numerous transport category class type ratings. He also held a commercial pilot certificate with airplane single-engine land privileges, a limited flight instructor certificate for airplanes and instrument airplane, a flight engineer certificate with a rating for turbojet powered, and a repairman experimental aircraft builder certificate for a Glasair model III aircraft. The pilot's most recent third class medical certificate was issued on December 4, 2007, with a limitation of "must have available glasses for near vision." At the time of the examination, the pilot reported a total of 21,811 flight hours. At the time of the accident, his medical certificated had expired but had never been denied. The accident airplane met the criteria for the light sport designation and the pilot was only required to have a valid driver's license and a pilot's certificate.

Aircraft and Owner/Operator Information

Aircraft Make:	HARRY L. WEBER	**Registration:**	N747HW
Model/Series:	ARION LI	**Aircraft Category:**	Airplane
Year of Manufacture:	2011	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	128
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	September 30, 2011 Condition	**Certified Max Gross Wt.:**	1320 lbs
Time Since Last Inspection:	4 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4 Hrs at time of accident	**Engine Manufacturer:**	Jabiru
ELT:	C91A installed, not activated	**Engine Model/Series:**	3300A
Registered Owner:	On file	**Rated Power:**	120 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The two-seat, low-wing, fixed gear, composite constructed airplane, serial number 128, was manufactured in 2011. According to FAA records, the airplane was issued a special airworthiness certificate on September 30, 2011, and was registered to the pilot. It was equipped with a Jabiru 3300A engine and according to a witness familiar with the construction of the airplane, it had about 4 total flight hours at the time of the accident. At the time of this writing no maintenance logbook records had been located.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MRB,565 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	17:53 Local	**Direction from Accident Site:**	183°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.19 inches Hg	**Temperature/Dew Point:**	23°C / 10°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Hedgesville, WV (WV22)	**Type of Flight Plan Filed:**	None
Destination:	Hedgesville, WV (WV22)	**Type of Clearance:**	None
Departure Time:	17:39 Local	**Type of Airspace:**	Class G

The 1753 recorded weather observation at Martinsburg Eastern West Virginia Regional/Shepherd Airport (MRB), Martinsburg, West Virginia, located approximately 10 miles to the south of the accident location, included wind from 340 degrees at 7 knots, visibility 10 miles, clear skies, temperature 23 degrees C, dew point 10 degrees C; barometric altimeter 30.19 inches of mercury.

Airport Information

Airport:	GREEN LANDINGS WV22	**Runway Surface Type:**	Grass/turf
Airport Elevation:	490 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:	21	**IFR Approach:**	None
Runway Length/Width:	2600 ft / 100 ft	**VFR Approach/Landing:**	None

Green Landings Airport (WV22) was a privately owned airport and at the time of the accident it did not have an operating control tower. The airport was equipped with one turf runway designated as runway 3/21. The runway was 2600-foot-long by 100-foot-wide and was reported as "in good condition" at the time of the accident. The airport elevation was about 490 feet above mean sea level.

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:**	39.570278,-77.967781

The airplane impacted a concrete wall at a nearby residence in a nose down attitude and fractured into two pieces just aft of the aft baggage wall.

Continuity was confirmed to all flight control surfaces from the control column and the rudder pedals. Continuity was confirmed to the elevator via the push/pull tube that was bent approximately mid span and was co-located with the impact damage of the airframe. The ailerons were operated by a push/pull tube system and continuity was confirmed from the control column to the right aileron bell crank. The left control column push/pull tube was found fracture separated at the base of the control column. Continuity was confirmed from the fracture point to the aileron bell crank.

Right wing

The right wing exhibited impact damage to the leading edge. The outboard section of the wing was impact separated beginning on the leading edge approximately 74.5 inches from the wing root and on the trailing edge, approximately 108 inches from the wing root, exposing the main wing spar. The main wing spar, comprised of fiberglass/composite material, was impact damaged and bent at the damaged point in the positive direction. The aileron was impact separated at the bell crank and located near the wreckage. The flap was impacted separated and co-located with the aileron. The right main landing gear remained attached at the fuselage attach point; however, was bent outward approximately 40 degrees beyond its normal position.

Empennage

The empennage was impact fractured approximately 65 inches forward of the elevator attach point and approximately 10 inches aft of the rear bulkhead. The elevator trim tab indicated approximately 8 degrees trailing edge down. The elevator and rudder remained attached to their respective attach points.

Left Wing

The left wing remained attached at the wing root; however, exhibited impact damage approximately 74 inches outboard of the fuselage attach point. The initial impact damage was consistent in dimension to the 6 inch by 6 inch anchor post, utilized to elevate the deck on the private residence, which the airplane impacted. The trailing edge impact separation point was slightly inboard of the aileron. The flap was impact separated at its respective attach points and was co-located with the wing and the anchor post. The aileron remained connected to its respective attach point; however, the associated push/pull tube was impact separated from the bell crank.

Engine

The engine remained attached to the firewall and the wood propeller blades were impact separated at the propeller hub. The engine mounts exhibited impact damage and numerous bends. The gascolator was of glass construction and was impact damaged. The propeller spinner exhibited torsional twisting.

The fuel pump remained attached to the engine, was removed, and examined. It contained a blue fluid similar in color and smell as 100LL aviation fuel.

The sparkplugs were removed and appeared to be relatively new with little wear and were tan in color. Thumb compression was achieved on all cylinders via hand rotation of the propeller hub. The right front cylinder indicated impact damage on the leading edge of the cylinder fins and was weaker in compression than the other 5 cylinders. The cylinder cover was removed and all parts were observed operating normally and smoothly with no malfunctions or abnormalities noted. The nose gear was impacted separated from the nose strut; however, the strut remained attached to the engine.

The magneto was spun utilizing the propeller hub and spark was observed at 4 of the cylinders. The other 2 cylinder lead wires exhibited impact damage.

The throttle and mixture controls were found in the full forward position; however, due to cockpit, firewall, and airframe damage, an exact setting on the engine could not be determined.

The engine oil dipstick was found in the engine and was removed; the dipstick had oil present.

Cockpit

The cockpit area exhibited impact crush damage. The left side of the cockpit wall was impact damaged and the fiberglass/composite and aluminum substructure was fractured and bowed outward. The seats remained attached to the airframe and the seatbelts and shoulder harnesses remained attached at their respective attach points. The right seat belts remained connected and operated normally. The left seat belt webbing indicated stretching and the male/female end were disconnected by first responders to facilitate removal of the pilot. The shoulder harnesses attached point was located in the tail section aft of the break near the elevator. The rudder pedals were manual adjusted rudder pedals utilizing a bungee and tube system. The firewall appeared to have been slid aft approximately 7 inches and was buckled approximately midspan. The cockpit canopy was impact damaged and pieces of the plexiglass canopy were co-located with the wreckage. The cabin area midline seam exhibited a longitudinal fracture along the entire roof of the cabin area to the impact fracture.

Fuel

The cockpit fuel selector valve was found in the "R" position indicating the right tank was selected. The left wing fuel tank was full of fuel and the right wing fuel tank had approximately 1 inch in depth of fuel. Both fuel tank caps remained secured and in place. A fuel receipt was produced by a local fixed base operator indicating that the day prior to the accident the airplane was fueled with 16.0 gallons of fuel.

The Emergency Locator Transmitter (ELT) was located in the wreckage; however, no signal was reported around the time of the accident.

Medical and Pathological Information

An autopsy was performed on the pilot on October 6, 2011, by the Department of Health, Office of the Chief Medical Examiner, Manassas, Virginia. The cause of the death was reported as "blunt force trauma to thorax and extremities."

Forensic toxicology was performed on specimens from the pilot by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The toxicology reported stated Amlodipine was detected in the liver and the blood, Etomidate was detected in the liver; 0.101 (ug/mL, ug/g) Midazolam was detected in the liver; however, neither Etomidate nor Midazolam were detected in the blood.

Review of the pilot's personal medical records by an NTSB medical officer revealed a diagnosis of hypertension and Amlodipine (marketed under the trade name Norvasc) is a medication used to treat hypertension. Etomindate is an anesthesia induction agent and Midazolam is a benzodiazepine commonly used for sedation during medical procedures; both of which are only available in intravenous formulations and were documented as being administered during the hospital resuscitation. Trauma medical records also included documentation of the pilot's usual medication. Those listed medications were used to treat hypertension, decrease the heart's work in moderate to severe congestive heart failure, as well as other medications that treat and prevent life-threatening, recurrent ventricular arrhythmias and also used to treat atrial fibrillation.

During the autopsy an indwelling medical device was removed and sent to the manufacturer for readout. There was no evidence of a tachyarrhythmia or defibrillation being recorded. The autopsy also revealed that the heart was enlarged overall and a "bulging left ventricle" with left ventricular hypertrophy. There was evidence of minimal coronary artery disease; however, the lateral aspect of the left ventricle has a 3.0 cm area of interstitial fibrosis was consistent with a remote heart attack. Review of the indwelling medical device manufacturer's records showed a previous pacemaker had been exchanged for a combination pacemaker/automated internal cardiac defibrillator about 8 months prior to the accident. For further information please refer to the "Medical Factual" report located in the docket associated with this accident.

Additional Information

A Garmin 696 GPS was recovered from the accident airplane and was sent to the NTSB Records Laboratory for download. The GPS began recording data earlier in the day and also included data just prior to the accident. The last recorded data occurred at 1737:44 with a groundspeed of 55 knots and a

GPS Altitude of 512 feet. Several data recordings that occurred prior to the last recording indicated a ground speed consistently under 10 knots and a GPS altitude of between 436 and 486 feet.

According to CFR 61.23(c) states in part "a person must hold and possess either a medical certificate issued under part 67 of this chapter or a U.S. driver's license when… (ii) Exercising the privileges of a sport pilot certificate in a light-sport aircraft other than a glider or balloon."

According to CFR 61.53(b) "Prohibition on operations during medical deficiency" states in part "… Operations that do not require a medical certificate…a person shall not act as pilot in command, or in any other capacity as a required pilot flight crewmember, while that person knows or has reason to know of any medical condition that would make the person unable to operate the aircraft in a safe manner."

CFR Part 67 in reference to "Cardiovascular" states in part "…no established medical history or clinical diagnosis of any of the following: (e) permanent cardiac pacemaker implantation…"

According to the FAA "Guide for Aviation Medical Examiners" which states in part "… the placement of a pacemaker is disqualifying for pilots, but special issuances may be considered…" The guide further notes that there was specific protocol regarding the information the FAA would request in order to grant a special issuance.

Administrative Information

Investigator In Charge (IIC):	Etcher, Shawn
Additional Participating Persons:	Bentley F Hunte; FAA/FSDO; Glen Burnie, MD
Original Publish Date:	March 7, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=81994