



Aviation Investigation Final Report

Location:	Grass Valley, California	Accident Number:	WPR23FA110
Date & Time:	February 19, 2023, 13:35 Local	Registration:	N420PF
Aircraft:	WILLMAN LOREN LOREN'S AIRCAM	Aircraft Damage:	Substantial
Defining Event:	Aerodynamic stall/spin	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot and passenger departed the airport to conduct a local flight. ADS-B data revealed that the flight was conducted at a low altitude that overflowed areas of interest. The airplane was flying near the passenger’s property, at an altitude that witnesses estimated as about 100 ft or less above ground level (agl), and an airspeed estimated to be around 50 mph, but likely closer to the airplane’s published stall speed of 39 mph. The airplane exhibited a “wobble” and then entered an aerodynamic stall/spin and impacted open terrain in a nose-low attitude.

Postaccident examination of the airframe and engines revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The airframe damage, wreckage distribution and near-vertical impact were consistent with a stall/spin while still under engine power.

According to a witness, the pilot had a history of conducting low altitude flights in the accident airplane. Before the accident, the accident pilot told a fellow pilot that he did not fly above 500 ft agl. During the first months of ownership, the local airport manager received complaints about the pilot’s low-altitude flying.

The airplane’s Pilot’s Operating Handbook (POH) states that the airplane did not come equipped with a stall warning device and that stall indications were not easily recognizable. The POH also advised operators to not operate at low altitudes at airspeeds less than 50 knots and advised operators to stay at least 500 ft away from people and property.

Toxicology testing of the pilot indicated the presence of THC (tetrahydrocannabinol), the active compound in marijuana. There is no known relationship between tissue levels and impairment;

therefore, whether the pilot's use of a potentially impairing substance contributed to the accident 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 failure to maintain adequate airspeed and his exceedance of the airplane's critical angle of attack, which resulted in an aerodynamic stall/spin at an altitude too low for recovery.

Findings

Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Pilot
Personnel issues	Understanding/comprehension - Pilot
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Maneuvering-low-alt flying	Aerodynamic stall/spin (Defining event)
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On February 19, 2023, about 1335 Pacific standard time, an experimental, amateur-built amphibious Lockwood Air-Cam, N420PF, was substantially damaged when it was involved in an accident near Grass Valley, California. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulation* Part 91 personal flight.

According to the pilot's brother-in-law, before the accident, the pilot took him on a local flight and stayed within five miles of the Nevada County Airport (GOO), Grass Valley, California. He estimated that the lowest altitude that they flew at was about 800 ft agl. ADS-B data showed this flight originated about 1219 and terminated about 1237. Most of the flight was calculated to have been about 250 to 500 ft agl. A Google Earth image with ADS-B data showing the flight with the brother-in-law is shown in Figure 1. The ADS-B track showed multiple areas of lost coverage.

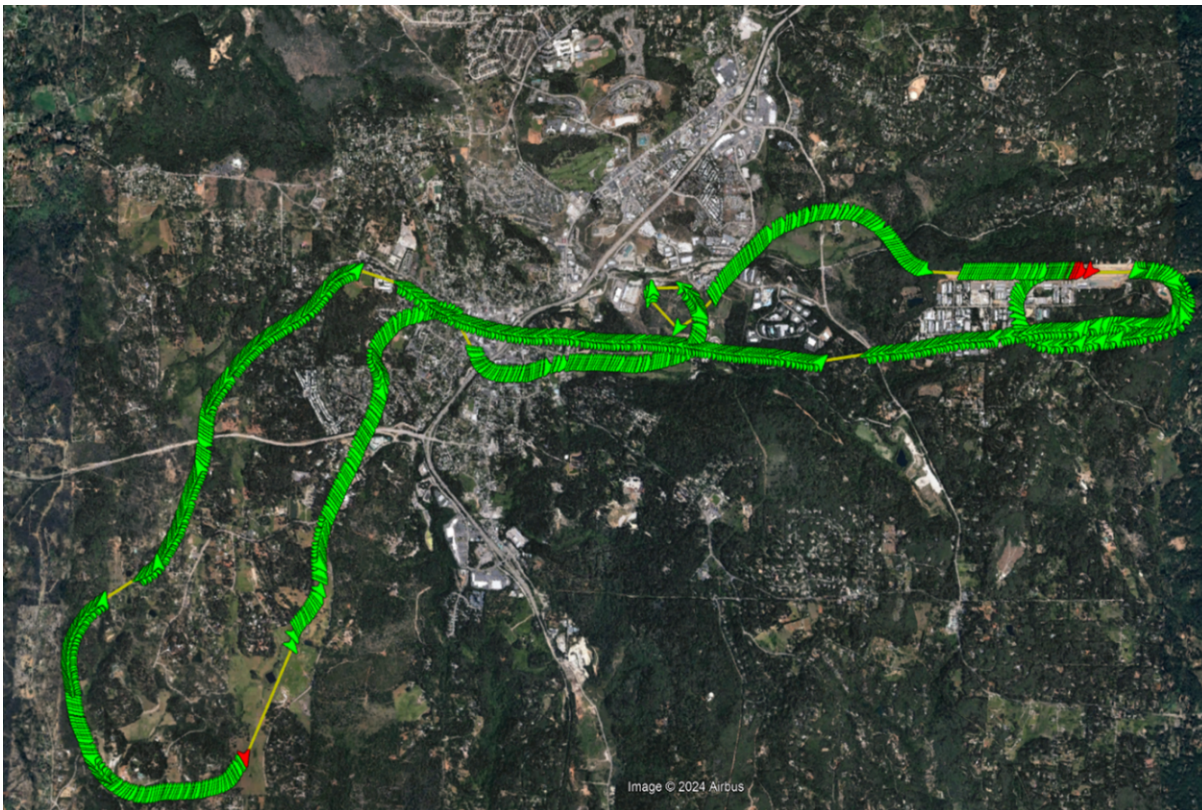


Figure 1. Google Earth image showing the ADS-B track of the flight with the pilot's brother-in-law as a passenger.

According to the brother-in-law, after the flight ended, the pilot taxied to his personal hangar that was located on his property, adjacent to the airport. The brother-in-law exited the airplane. A female friend of the family then got into the airplane, and the pilot and female passenger taxied away.

A witness, who was located at the GOO fuel island, reported that the pilot, with a female passenger, taxied to the fuel island. The witness reported that the pilot topped the airplane off with 100 low lead aviation fuel. During a conversation, the pilot told the witness that he didn't fly above 500 ft agl. The witness cautioned to the pilot about hazards of flying at that altitude.

ADS-B data for the accident flight showed that the airplane departed GOO on runway 25 about 1309 and proceeded to the south. The recorded airplane altitudes and the intermittent ADS-B reception were consistent with low-altitude, maneuvering flight. About 3 minutes after takeoff, the airplane circled a large field near private property while about 200 to 300 ft agl. The airplane then proceeded southward to the north end of Rollins Reservoir. ADS-B data was lost temporarily about 1315 and regained about 1318 when the airplane was past the south end of the reservoir, above a dam. The flight continued along a river where ADS-B data was again lost about 1319. ADS-B data was regained about 1322 and showed that the airplane travelled about 1.7 miles southwest of the dam. About 1323 the airplane began a right 180° turn and crossed over a ridgeline. About this time, multiple witnesses reported observing the airplane operating at a low altitude, described as about 50 to 100 ft above the trees to about 200 ft and at an estimate speed of about 45 to 50 miles per hour. ADS-B data stopped at the completion of the 180° turn. The last data point recorded the airplane about 2,400 ft above mean sea level, or about 178 ft agl, about 2005 ft southeast of the accident site. A witness reported seeing the airplane as it traveled in a straight line, over her house, about 100 ft from the ground and about 50 mph. She saw the airplane's wing tilt to the right, then the airplane "nosed-dived straight down." Another witness said that it was going really slow and had a wobble, followed by a descent he described as, "nose first and the tail was straight up."

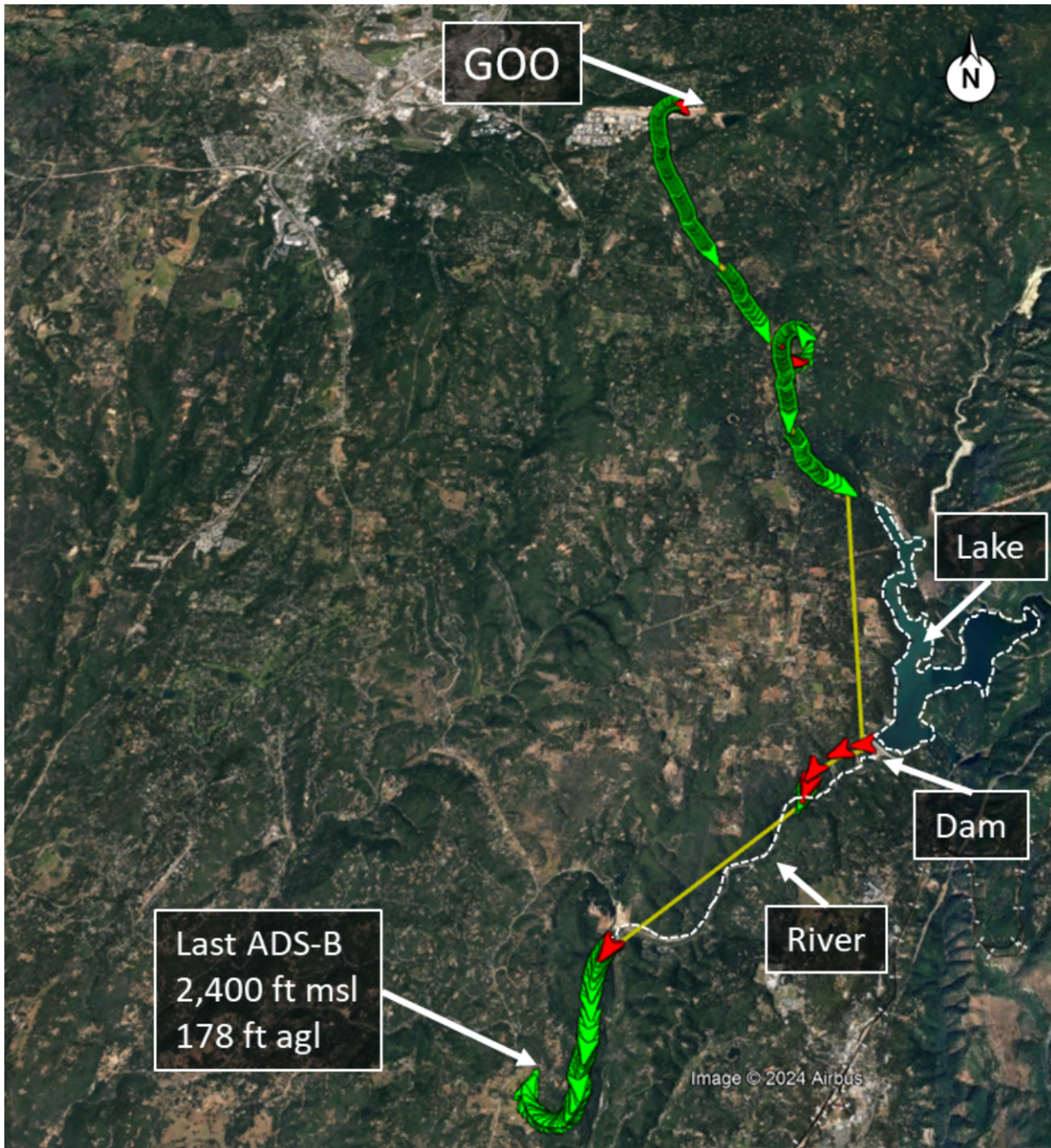


Figure 2. Google Earth image showing ADS-B data for the entire accident flight. The dashed lines highlight the lake and the river.

Another witness provided a photograph of the accident airplane that was taken on the day of the accident (Figure 3). A section of a house roof was visible in the frame. One witness stated that the female passenger lived in a house very close to the accident site.



Figure 3. Photo taken of the accident airplane on the day of the accident. (Source: witness)

In interviews with people familiar with the pilot, one person mentioned that the pilot’s low-altitude airport pattern work was common. He mentioned that the pilot always left the landing gear down. The airport manager reported that around November 2022, he received complaints of the pilot flying about 100 to 200 ft agl near the community of Morgan Ranch housing development. He sent an email to the pilot advising him of the complaints.

Pilot Information

Certificate:	Private	Age:	63, Male
Airplane Rating(s):	Single-engine land; Single-engine sea	Seat Occupied:	Front
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	December 14, 2021
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 1451 hours (Total, all aircraft), 500 hours (Total, this make and model), 500 hours (Pilot In Command, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:		Age:	55,Female
Airplane Rating(s):		Seat Occupied:	Rear
Other Aircraft Rating(s):		Restraint Used:	4-point
Instrument Rating(s):		Second Pilot Present:	
Instructor Rating(s):		Toxicology Performed:	
Medical Certification:		Last FAA Medical Exam:	
Occupational Pilot:	UNK	Last Flight Review or Equivalent:	
Flight Time:			

The pilot reported a total of 1451 flight hours on his last medical examination dated December 14, 2021. A review of the pilot's logbook revealed that the pilot accumulated about 1,408.0 hours. According to the pilot's wife, he accumulated about 50 hours flight experience in the accident airplane.

Aircraft and Owner/Operator Information

Aircraft Make:	WILLMAN LOREN	Registration:	N420PF
Model/Series:	LOREN'S AIRCAM	Aircraft Category:	Airplane
Year of Manufacture:	2022	Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	001
Landing Gear Type:	Tailwheel; Amphibian	Seats:	2
Date/Type of Last Inspection:	September 8, 2022 Annual	Certified Max Gross Wt.:	2000 lbs
Time Since Last Inspection:	0 Hrs	Engines:	2 Reciprocating
Airframe Total Time:	0 Hrs as of last inspection	Engine Manufacturer:	ROTAX
ELT:	Installed	Engine Model/Series:	912UL SERIES
Registered Owner:	On file	Rated Power:	80 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

The airframe, serial number 001, was owned by the pilot. According to the manufacturer, the serial number did not match any serial numbers created by the company. The pilot filed an

affidavit of ownership for amateur built and other non-type certificated aircraft form on June 27, 2022.

A review of maintenance records revealed the airframe was designated as a new build on September 8, 2022, with 0-hour tachometer time and 0-hour total time. A writeup dated September 22, 2022, stated that an amateur-built experimental airworthiness certificate and operating limitations was issued for the airplane and signed by a representative of the local FAA Flight Standards District Office.

A copy of the airplane's weight and balance was not recovered. A calculated weight and balance was computed using an exemplar Air-Cam's empty weight, full fuel, and estimated pilot and passenger weights, and found to be within the manufacturer's guidance.

The POH for the Air-Cam stated, in part,

"First and foremost, the Air-Cam does not come with any type of stall warning indicator and there is very little buffeting to warn of an approaching stall."

"Flying low and slow in the Air-Cam is a lot of fun but please remember the following."

#3 Don't let your airspeed get too low. Remember, the Air-Cam is rock solid right down to the stall which means you can accidentally fly much closer than intended to the stall. 50 mph is a good min. IAS [minimum indicated airspeed]."

#5 FAA regs [regulations]. Avoid densely populated areas and stay at least 500 ft away from people and property (like boats, cars, horses, and buildings) in sparsely populated areas."

According to the Air Cam POH, the stall speed for the airplane was 39 mph.

According to the manufacturer, if the control stick is held aft and the airplane is stalled while power is still applied by the engines, and if the control stick is then pushed forward, the airplane will develop an extremely nose-low attitude.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KG00,3153 ft msl	Distance from Accident Site:	8 Nautical Miles
Observation Time:	13:15 Local	Direction from Accident Site:	358°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	300°	Turbulence Severity Forecast/Actual:	N/A / Severe
Altimeter Setting:	30.05 inches Hg	Temperature/Dew Point:	16°C / -3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Grass Valley, CA (G00)	Type of Flight Plan Filed:	None
Destination:	Grass Valley, CA (G00)	Type of Clearance:	None
Departure Time:	13:00 Local	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	39.093996,-120.99763(est)

The airplane impacted terrain in an open field surrounded by pine trees of about 70 to 80 ft tall. The first point of probable impact was 3 gouges in the terrain about 10 ft west of the main wreckage. The gouges were consistent with the impacts made by the nose of the airplane and the tips of the two floats.

The debris field was contained to an area of no more than 50 ft around the wreckage, with one propeller blade found beyond that area. The floats remained attached to the undercarriage and the retractable wheels were found extended. The tips of the floats were crushed aft, and the damage extended to the front strut of the landing gear. The nose of the fuselage and the cabin were extensively crushed aft, with the damage extending back to the front strut of the landing gear. Examination of the airframe verified flight control continuity throughout the airframe from the cockpit controls to all primary flight control surfaces.

Postaccident examinations of the engines were performed at a secure facility. The left engine exhibited minor damage, and a test run verified normal operations. The engine started easily and ran normally at idle without effort. The right engine exhibited damage that precluded a test run. A teardown examination was conducted that revealed no mechanical anomalies.

Postaccident examination of the airframe and engines revealed no evidence of preaccident mechanical malfunctions or failures that would have precluded normal operation.

Medical and Pathological Information

An autopsy of the pilot was conducted by the Office of the Sheriff-Coroner, Nevada County, Nevada City, California. The cause of death was multiple blunt injuries.

The FAA Forensic Sciences Laboratory performed toxicology testing of postmortem specimens from the pilot. Delta-9-THC was detected at a low level in femoral blood. Delta-9-THC was also detected in lung tissue, at 2 ng/g. 11-hydroxy-THC was detected in femoral blood at 1.7 ng/mL and in lung tissue at 2 ng/g. Carboxy-delta-9-THC was detected in femoral blood at 16.3 ng/mL and in lung tissue at 18.2 ng/g.

Delta-9-THC is the primary psychoactive chemical in cannabis, including marijuana and hashish. Delta-9-THC may be inhaled or ingested recreationally by users seeking mind-altering effects. It may also be used medicinally by users seeking to treat illness-associated nausea, chronic pain, and other symptoms of some chronic diseases. Pharmacologically pure delta-9-THC is available as a prescription medication, often used to treat involuntary weight loss secondary to chronic disease and nausea associated with chemotherapy. The specific psychoactive effects of delta-9-THC vary depending on the user, user history of use, dose consumed, and route of consumption. Effects of delta-9-THC consumption may impair motor coordination, worsen reaction time, impair decision making and problem solving, distort perceptions of reality, and decrease vigilance. 11-hydroxy-THC is the primary active metabolite of delta-9-THC. Carboxy-delta-9-THC is a non-psychoactive metabolite of delta-9-THC. Research shows inconsistent correlation between the presence and magnitude of impairment and THC concentrations in blood in living persons. Delta-9-THC is a federally controlled substance, and the FAA considers it unsuitable for flying, regardless of individual state cannabis laws.

Administrative Information

Investigator In Charge (IIC): Salazar, Fabian

Additional Participating Persons: Bryan Combs; Federal Aviation Administration; Sacramento, CA
Phill Lockwood; Lockwood Aircraft Corporation; Sebring, FL
Jordan Paskevitch; Rotech Flight Safety Inc.; Vernon

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Last Revision Date:

Investigation Class: [Class 3](#)

Note:

Investigation Docket: <https://data.nts.gov/Docket?ProjectID=106746>

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](#).