Aviation Investigation Final Report

Location:	Lakeside, California	**Accident Number:**	WPR13FA076
Date & Time:	December 29, 2012, 10:15 Local	**Registration:**	N5M
Aircraft:	MCKENZIE LANCAIR IV-P TURBINE	**Aircraft Damage:**	Substantial
Defining Event:	Miscellaneous/other	**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The noninstrument-rated private pilot departed on a cross-country flight in the amateur-built, experimental, turbine-powered airplane. The weather observations indicated two layers of clouds with multiple base layers from 3,600 feet above ground level (agl) and a broken ceiling about 6,000 feet agl. After departure, the pilot told an air traffic controller that he was looking for a hole to get above the clouds. The airplane was likely flying between the two cloud layers as the pilot attempted to find a hole in order to climb above the upper cloud layer. Six minutes after departure, witnesses on the ground observed the airplane descending in a "flat spin." The recorded data from the airplane's onboard electronic flight information system showed that the pilot had climbed to about 6,858-feet pressure altitude (about 5,800 feet agl) while letting the airplane's airspeed decay from about 220 knots to about 76 knots, at which time the airplane entered a spin. The data showed that the airplane completed about seven 360-degree rotations in the spin before it impacted the ground. Further, the data indicated that the airplane's engine was operating normally, and after the first 360-degree rotation, the propeller rpm dropped from about 1,800 to 1,000, consistent with the pilot feathering the propeller. Postaccident examination of the airplane revealed damage consistent with the airplane impacting terrain in a flat spin, and the propeller blades were found in the feathered position. No evidence of any preimpact mechanical discrepancies were found with the airplane's airframe, engine, or propeller that would have prevented normal operation.

The medications metoprolol and tamsulosin were detected at unquantified levels in the pilot's muscle and liver. Neither of these medications was likely to have resulted in impairment. The pilot had reported use of tamsulosin to the Federal Aviation Administration (FAA) in May 2011. The use of metoprolol was not reported to the FAA, and it is unknown when the pilot began taking this medication or for what reason he was taking it.

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 attempting a visual climb through a broken cloud layer, which resulted in a stall/spin.

Findings

Aircraft	Airspeed - Not attained/maintained
Aircraft	Lateral/bank control - Not attained/maintained
Personnel issues	Lack of action - Pilot

Factual Information

History of Flight

Enroute-climb to cruise	Aerodynamic stall/spin
Enroute-climb to cruise	Miscellaneous/other (Defining event)

On December 29, 2012, about 1015 Pacific standard time, a McKenzie Lancair IV-P Turbine, amateur-built experimental airplane, N5M, was substantially damaged when it impacted terrain in an uncontrolled descent near Lakeside, California. The private pilot and his two passengers were fatally injured. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the personal cross-country flight, which had originated from Montgomery Field Airport, San Diego, California, approximately 6 minutes before the accident, with an intended destination of Deer Valley Airport, Phoenix, Arizona. A flight plan had not been filed.

The pilot contacted the Montgomery Field air traffic control tower at 1005:26, and requested taxi for takeoff and an east-bound departure. He acknowledged receiving instructions to taxi to runway 28R. At 1008:56, the pilot was cleared for takeoff and instructed to make a right downwind (east) departure, which would keep the airplane clear of the class B airspace located 1.5 nautical miles (nm) north of Montgomery Field. However, after takeoff, the airplane did not turn to the east, rather it flew north towards the class B airspace. When the tower controller queried the pilot about his intentions stating that he was about to enter the class B airspace, the pilot replied that he was turning eastbound. The airplane continued north, entering class B airspace without a clearance, before it turned eastbound.

At 1012:08, the pilot checked in with his next controller. He stated that he was eastbound and "…trying to get above the clouds but… couldn't find a hole…." He then requested flight following to Deer Valley. The controller gave the pilot a discreet transponder squawk code of 5217, instructed him to fly a heading of 060 degrees for departure from the class B airspace, and cleared him to "climb VFR [visual flight rules]" at his discretion.

At 1014:53, the controller told the pilot to reset his transponder squawk code to 1321. The pilot did not respond. At 1015:22, the controller asked the pilot if he could hear his transmissions. At 1015:26, the pilot responded with "trouble…." The controller made repeated attempts to contact the pilot with negative results. Witnesses on the ground reported seeing the airplane below a cloud layer descending in a "flat spin" until they lost sight of it behind a hill. The witnesses heard a "loud thud" and reported the accident to local authorities.

Pilot Information

Certificate:	Private	**Age:**	65
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 5, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1600 hours (Total, all aircraft), 200 hours (Total, this make and model), 1 hours (Last 24 hours, all aircraft)		

The 65-year-old pilot held a private pilot certificate with airplane multiengine land and airplane single engine land ratings. He did not possess an instrument rating. His most recent third-class Federal Aviation Administration (FAA) medical certificate was issued on May 5, 2011. He reported on his most recent medical application that he had about 1,600 hours of flight experience and had flown about 50 hours in the past 6 months.

Aircraft and Owner/Operator Information

Aircraft Make:	MCKENZIE	**Registration:**	N5M
Model/Series:	LANCAIR IV-P TURBINE	**Aircraft Category:**	Airplane
Year of Manufacture:	2003	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	LIV-490
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	November 10, 2011 Condition	**Certified Max Gross Wt.:**	3890 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo prop
Airframe Total Time:	850 Hrs at time of accident	**Engine Manufacturer:**	Walter
ELT:	Installed, not activated	**Engine Model/Series:**	M601-EX
Registered Owner:	STERN WILLIAM A JR	**Rated Power:**	740 Horsepower
Operator:	STERN WILLIAM A JR	**Operating Certificate(s) Held:**	None

The airplane was a single-turbine-engine-powered, propeller-driven, four seat, pressurized, retractable-gear airplane, which had a special airworthiness certificate (in the experimental category) issued on March 13, 2003. The airplane was built by an individual from a kit manufactured by Lancair International, Inc. It was powered by a Walters M601-EX free turbine engine, serial number 874-039,

which had a maximum takeoff rating of 740 horsepower and a continuous rating of 657 horsepower. It had a three bladed, constant speed, full feathering Hartzell propeller. According to the airplane's maintenance logbooks, the most recent condition inspection was completed on November 10, 2011. According to an entry in the airframe logbook dated June 1, 2003, the airplane's builder flight tested the airplane and determined that, at a gross weight of 3,300 pounds, the stall speed in the landing configuration (Vso) was 65 knots; the stall speed clean (Vs) was 80 knots; best angle of climb speed (Vx) was 120 knots; and best rate of climb speed (Vy) was 140 knots.

According to a weight and balance document from the airplane's maintenance records dated June 1, 2005, its maximum takeoff gross weight was 3,890 pounds; its empty weight was 2,492 pounds; and its center of gravity range was 86.5 to 94.5 inches. An estimate of the airplane's weight and balance at the time of the accident was calculated; the estimate indicated that the airplane's gross weight was 3,751 pounds, and its center of gravity was 92.4 inches.

The cockpit instrumentation included two Sierra Flight Systems Integrated Display Units (IDU), which are Electronic Flight Information Systems (EFIS). These systems provide multifunction display (MFD) and primary flight display (PFD) capabilities.

The pilot purchased the airplane on June 6, 2005.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SEE,388 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	10:47 Local	**Direction from Accident Site:**	185°
Lowest Cloud Condition:	Scattered / 3500 ft AGL	**Visibility**	15 miles
Lowest Ceiling:	Overcast / 5000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.05 inches Hg	**Temperature/Dew Point:**	12°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Montgomery Fiel, CA (MYF)	**Type of Flight Plan Filed:**	None
Destination:	Phoenix, AZ (DVT)	**Type of Clearance:**	VFR flight following
Departure Time:	10:05 Local	**Type of Airspace:**	

At 0953, the weather conditions at Montgomery Field Airport (elevation 427 feet), located 235 degrees for 10 nautical miles (nm) from the accident site, were as follows: wind 130 degrees at 6 knots; visibility 10 statute miles (sm); cloud condition, overcast at 5,500 feet; temperature 54 degrees Fahrenheit; dew point 39 degrees Fahrenheit; altimeter setting 30.08 inches of Mercury.

At 0955, the weather conditions at Miramar Marine Corps Air Station (elevation 477 feet), San Diego, located 250 degrees for 9 nm from the accident site, were as follows: wind 130 degrees at 5 knots;

visibility 10 sm; cloud condition, broken at 3,500 feet and broken at 20,000 feet; temperature 55 degrees Fahrenheit; dew point 39 degrees Fahrenheit; altimeter setting 30.07 inches of Mercury.

At 1047, Gillespie Field Airport (elevation 388 feet), San Diego, 180 degrees for 5 nm from the accident site, were as follows: wind calm; visibility 15 sm; cloud condition, scattered at 3,600 feet and broken at 6,000 feet; temperature 54 degrees Fahrenheit; dew point 37 degrees Fahrenheit; altimeter setting 30.06 inches of Mercury. This observation indicated two layers of clouds with multiple base layers from 3,600 feet above ground level (agl) and a broken ceiling at 6,000 feet agl.

A National Transportation Safety Board Weather Study was performed. The meteorologist reported that satellite data indicated a band of clouds extended from the coast of the Pacific Ocean, over the accident area, to approximately 50 miles inland. The clouds tops over the accident site were from 7,000 to 5,000 feet agl. No cumulonimbus clouds or thunderstorms were indicated over the region at the time. For more information, see the Weather Study in the public docket for this accident.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	32.914722,-116.966392

The airplane was found at an elevation of 1,060 feet on a chaparral covered steep hillside in the Goodan Ranch Sycamore Canyon Preserve in San Diego County. The initial impact was about 150 feet down from a ridge crest, and the ground scar was oriented on a magnetic heading of about 350 degrees. The ground scar extended about 80 feet to the main wreckage. The airplane was found upright and flat, with its fuselage aligned about 350 degrees. The empennage had broken from the fuselage and was resting inverted on the top of the cabin section of the fuselage. The wings were in place and extensively damaged. From the initial impact point to the fuselage, large pieces of the lower wing skins were found. There was no evidence of fire.

The propeller spinner was crushed inward on about 1/3 of its diameter. The spinner did not exhibit any indications of rotation. One propeller blade was separated about 12 inches from its hub. The other two blades remained attached but were bent in a bow-like fashion. All three propeller blades were found in their feathered positions. All the airplane's components were accounted for at the accident site. Following the on scene examination, the wreckage was recovered to a secure salvage yard.

On January 4, 2013, at the salvage yard, the wreckage was further examined by a National Transportation Safety Board (NTSB) investigator, two FAA inspectors, and a representative of the kit manufacturer. The NTSB investigator oversaw the removal of the airplane's PFD, MFD, Engine AirData computer, and a Garmin 530 GPS/Nav/Comm unit.

On January 29 and 30, 2013, at the salvage yard, under the supervision of an NTSB investigator, a representative of the propeller manufacturer examined the airplane's propeller. The propeller manufacturer's representative stated that "the crushing damage to the spinner dome showed evidence of contact with a blade counterweight and piston. The spinner damage clearly indicated that the blades and piston were in the feather position at the time the spinner was crushed by impact." During the postaccident examinations, no evidence of any pre-impact mechanical discrepancies was found with the airplane's airframe, engine, or propeller that would have prevented normal operation.

Medical and Pathological Information

The San Diego County Office of the Medical Examiner performed an autopsy on the pilot on December 30, 2012. The FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma, performed toxicology tests on the pilot. Carbon monoxide and cyanide testing were not performed; no blood was available for testing. The muscle sample tested had 15 mg/dL of ethanol; however, the ethanol was from sources other than ingestion. No ethanol was detected in the heart or the brain. Muscle and liver samples were positive for metoprolol (a prescription beta-blocker used to treat high blood pressure, angina and control heart rate in some arrhythmias) and tamsulosin (a prescription medication used to treat benign prostatic hyperplasia).

On his medical certificate application dated May 5, 2011, the pilot reported the use of tamsulosin for benign prostatic hyperplasia. No other medication use was reported.

Tests and Research

The PFD, MFD, and Engine AirData computer were shipped to the NTSB's Vehicle Recorder Division in Washington, D.C. for recovery of stored flight data. Identical data was recovered from the PFD and the MFD; the Engine AirData computer does not record data. The accident flight was recorded on December 29, 2012, between 1004:42 and 1015:29. A full report, titled "Cockpit Displays – Recorded Flight Data," with plots of the recorded parameters is available in the public docket for this accident. The owner of the company that performed the most recent condition inspection reported that the parameter labeled N2 in the report was propeller rpm.

The recording indicated that the airplane departed about 1009:28. The airplane climbed out to the northwest, and about 3,100 feet pressure altitude, it began a turn towards the northeast. It initially climbed to a maximum recorded pressure altitude of 5,238 feet and then descended to 3,868 feet pressure altitude by 1013:35. The airplane then climbed to a maximum recorded pressure altitude of 6,858 feet at 1014:51. After reaching this maximum altitude, it descended to a last recorded pressure altitude of 1,428 feet at 1015:29.

After takeoff, the compressor turbine speed designated as N1 was about 95% and remained so until about 1012:24, when the airplane began to descend out of about 5,000 feet pressure altitude. By about

1012:38, N1 decreased to about 79%, the airplane was descending, and indicated airspeed was decreasing through 201 knots. From takeoff until about 1014:57, N2 was about 1,800 rpm. About 1013:40, N1 increased to 94%, as the airplane began to climb out of 3,968 feet pressure altitude, and the indicated airspeed decreased through 189 knots. During the time period from 1013:40 until 1014:41, the pitch attitude increased from 5 degrees to 26 degrees, the airspeed continued to decrease, the altitude increased, the bank angle was less than 5 degrees, and the airplane was heading northeasterly.

At 1014:35, the pitch attitude continued to increase to a maximum recorded value of 44.5 degrees; this pitch attitude was reached when the airspeed decreased to 76 knots. At 1014:46, the airplane began to roll left to a bank angle of 38 degrees, which then reduced to 8 degrees left before increasing to a maximum recorded value of 93 degrees left by 1014:53.

After 1014:52, the airplane began to descend, and the recorded heading cyclically rotated to the left, making nearly seven 360-degree turns before the recording ended at 1015:29. During the descent, the indicated airspeed reached a maximum value of about 95 knots, and the bank angle varied between about 20 degrees left and right.

After the first 360-degree heading change, at 1014:57, N1 and N2 began to decrease, with N1 reaching a minimum value of 64% at 1015:05 and N2 was reaching about 1,000 rpm at 1014:59. At 1015:18, as the airplane passed through about 3,200 feet pressure altitude, N1 began to increase. Over the next 4 seconds, N1 increased to 96% where it remained until the end of the recording. Over the last 30 seconds of recorded flight, N2 fluctuated between about 600 rpm and 1,200 rpm and did not increase when N2 began to increase at 1015:18

Administrative Information

Investigator In Charge (IIC):	Struhsaker, James
Additional Participating Persons:	Carl Allen; FAA FSDO; San Diego, CA Dan Boggs; Hartzell Propeller; Piqua, OH Bob Wolstenholmes; Lancair International; Redmond, OR
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