Aviation Investigation Final Report

Location:	Lake Berryessa, California	**Accident Number:**	WPR17FA101
Date & Time:	May 8, 2017, 09:08 Local	**Registration:**	N184BA
Aircraft:	ICON AIRCRAFT INC A5	**Aircraft Damage:**	Substantial
Defining Event:	Abrupt maneuver	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation		

Analysis

The commercial pilot departed in the light sport, amphibious airplane during daytime visual meteorological conditions to perform a new employee familiarization flight with the passenger, who the company had recently hired. A witness, who was in a boat on a lake, reported seeing the accident airplane flying about 30 to 50 ft over the water at what appeared to be between 30 to 40 mph. The witness added that, as the airplane passed by his position and entered a nearby cove, which was surrounded by rising terrain on either side and at its end, he heard the engine "rev up and accelerate hard" as the airplane approached the right side of the canyon "in what appeared to be an effort to climb out of" the canyon. Subsequently, the airplane climbed to about 100 ft above the water and entered a left turn as it began to descend before it flew beyond the witness's field of view. The witness stated that he heard the sound of impact shortly after losing sight of the airplane.

Review of recorded data from two separate recording devices installed in the airplane revealed that, about 15 minutes after departure, the airplane started a descent from 3,700 ft GPS altitude. About 7 minutes later, it had descended to 450 ft GPS altitude and turned to a northerly heading, staying over the water between the shorelines. About 46 seconds later, at a GPS altitude of 450 ft and 54 knots indicated airspeed (KIAS), the airplane entered the cove. About 20 seconds later, engine power was increased, and the airplane began to climb while it turned slightly right before initiating a left turn. The airplane reached a maximum GPS altitude of 506 ft before it began to descend. Shortly after, the airplane impacted terrain at a GPS altitude of 470 ft and 66 KIAS. Postaccident examination of the airframe and engine revealed no evidence of any preexisting mechanical malfunctions that would have precluded normal operation.

It is likely that the pilot mistakenly thought the canyon that he entered was a different canyon that led to the larger, open portion of the lake. Additionally, it is likely that, once the pilot realized there was no exit from the canyon, he attempted to perform a 180° left turn to exit in the direction from which he entered. Based upon performance information outlined in the Pilot's Operating Handbook for the accident airplane, the airplane's altitude above the water's surface and its indicated airspeed, and the ridge line elevations in the area adjacent to the accident site, the airplane would have not been able to

climb out of the rising terrain that surrounded the area, which led to his failure to maintain clearance from terrain.

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 clearance from terrain while maneuvering at a low altitude. Contributing to the accident was the pilot's mistaken entry into a canyon surrounded by steep rising terrain while at a low altitude for reasons that could not be determined.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Use of equip/system - Pilot
Aircraft	Altitude - Not attained/maintained
Environmental issues	Mountainous/hilly terrain - Ability to respond/compensate
Personnel issues	Incorrect action selection - Pilot
Personnel issues	Geographic disorient (lost) - Pilot

Factual Information

History of Flight

Maneuvering-low-alt flying	Abrupt maneuver (Defining event)
Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT)

On May 8, 2017, about 0908 Pacific daylight time, an amphibious, light sport Icon Aircraft, Inc., A5, N184BA, impacted terrain while maneuvering near Lake Berryessa, California. The commercial pilot and passenger were fatally injured, and the airplane sustained substantial damage. The airplane was registered to a private individual and operated by Icon Aircraft, Inc., Vacaville, California, as a 14 Code of Federal Regulations Part 91 business flight. Visual meteorological conditions prevailed near the accident site about the time of the accident, and no flight plan was filed. The local flight originated from Nut Tree Airport (VCB), Vacaville, California, at 0852.

Representatives from Icon Aircraft reported that the pilot was conducting a new employee familiarization flight with the passenger, who the company had recently hired. A witness, who was in a boat on Lake Berryessa near the entrance to Little Portuguese Canyon, reported seeing the airplane flying about 30 to 50 ft above the lake at what appeared to be between 30 to 40 mph. The witness stated that the engine was running smoothly and that the airplane was level. The airplane passed by his position flying in a northerly direction and entered Little Portuguese Canyon. The witness reported hearing the engine "rev up and accelerate hard" as the airplane approached the right side of the canyon "in what appeared to be an effort to climb out of" the canyon. Subsequently, the airplane climbed to about 100 ft above ground level and then entered a left turn as it began to quickly descend. The witness stated that it appeared that the pilot attempted to make a "U-turn in the air" just before the airplane flew beyond his field of view. The witness stated that he heard the sound of impact shortly after losing sight of the airplane.

A second witness, who was located inside a house boat parked in a cove adjacent to the accident site, reported that she saw an airplane fly by her position at a low altitude in a northerly direction and did not see it return. The witness added that neither her nor anyone in her group heard the airplane impact the ground.

The airplane was equipped with a flight data monitoring device that captured data from the flight data computer. In addition, the airplane was equipped with an engine control unit that captured the most recent hour of data from the engine. The recovered data showed that the engine was started at 0839:34, and that, at 0852:00, the airplane departed runway 2 at VCB and then initiated a left turn to a northerly heading. The airplane reached a maximum GPS altitude of about 3,700 ft at 0900:00 and began to descend shortly thereafter. At 0905:25, the airplane turned to the west, crossed the shore of Lake Berryessa near the Monticello Dam, and continued to descend. By 0906:44, the airplane descended to 450 ft GPS altitude and turned to a northerly heading while it remained over the water between the shorelines. At 0907:30, the airplane entered Little Portuguese Canyon at 450 ft GPS altitude and 54 KIAS. At 0907:50, engine power was increased, and the airplane began to climb while it turned slightly east and then initiated a left turn to the west. The airplane reached a maximum altitude of 506 ft GPS

altitude at 0908:03 before it began to descend. The airplane struck terrain at 0908:06 at 470 ft GPS altitude and 66 KIAS. Throughout the entire span of the recorded data, all engine parameters were within the normal operating range. For further information regarding the downloaded data, see the Other Devices Factual Report in the public docket for this accident.

Lake Berryessa is a reservoir that is about 23 miles long and 3 miles wide. The southern area of the lake features various coves and canyons, which are mostly surrounded by areas of steep rising terrain. In addition, there is only one entrance to the larger area of the lake from the southern area of the lake. The areas of rising terrain that surrounded Little Portuguese Canyon varied between 780 and 1,420 ft msl. The accident site was located about 0.35 nautical mile (nm) from the tops of 1,200-ft-high ridges to the west, 0.36 nm from the 1,050-ft-high ridges to the east, and 1.34 nm from the 1,200-ft-high ridges to the north. In addition, Little Portuguese Canyon narrowed in width from about 700 ft at the opening to about 300 ft near the accident site and 240 ft near the farthest northern area of the canyon.

Pilot Information

Certificate:	Commercial	**Age:**	55,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Glider	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	November 25, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	4506 hours (Total, all aircraft), 595 hours (Total, this make and model), 4317 hours (Pilot In Command, all aircraft), 23 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

The pilot held a commercial pilot certificate with airplane single-engine and multiengine land and sea, rotorcraft helicopter, glider, and instrument airplane ratings. The pilot was issued a Federal Aviation Administration (FAA) second-class airman medical certificate on November 25, 2016, with the limitation that he "must wear corrective lenses." At the time of his most recent medical application, the pilot reported that he had accumulated 4,600 hours total flight time, 14 hours of which were in the previous 6 months.

Review of the pilot's logbook and company flight records revealed that the pilot had accumulated a total of 4,506 hours of flight time, 595 hours of which were in the accident make/model airplane. The pilot had logged 23 hours of flight time in the 90 days before the accident. The pilot's most recent flight review was completed on April 23, 2016.

The passenger did not hold any pilot or medical certificates.

Aircraft and Owner/Operator Information

Aircraft Make:	ICON AIRCRAFT INC	**Registration:**	N184BA
Model/Series:	A5 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	2016	**Amateur Built:**	
Airworthiness Certificate:	Special light-sport (Special)	**Serial Number:**	00007
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	May 5, 2017 100 hour	**Certified Max Gross Wt.:**	1510 lbs
Time Since Last Inspection:	88 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	182.7 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	912
Registered Owner:	Kurt Parker	**Rated Power:**	100 Horsepower
Operator:	Icon Aircraft Inc	**Operating Certificate(s) Held:**	None

The two-seat, high-wing, retractable gear, amphibious light sport airplane, serial number 00007, was manufactured in 2016. It was powered by a 100-horsepower Rotax 912IS Sport engine and was equipped with a Sensenitch three-blade propeller. In addition, the airplane was equipped with a ballistic recovery parachute. Review of the airframe and engine maintenance logbook records revealed that the most recent 100-hour inspection was completed on May 5, 2017, at a Hobbs time of 94.8 hours. At the time of the accident, the engine and airframe had accumulated 182.7 hours since new.

The accident make/model airplane's Pilot's Operating Handbook, Section 2.2, "Airspeed Limitations," noted that the published clean configuration stall speed (Vs) was 45 knots indicated airspeed (KIAS) at idle power, maximum takeoff weight, and flaps not extended. The published landing configuration stall speed (Vso) was 39 KIAS at idle power, maximum takeoff weight, and flaps extended to 30°.

Section 5.1, "Summary of Performance Specifications," stated that the best angle of climb speed (Vx) with flaps retracted was 54 KIAS and that the best rate of climb speed (Vy) was 58 KIAS. Section 5.4.1 stated that, at maximum gross weight, the stall speeds for flaps retracted, 0°, 30°, 45°, and 60° angle of bank were 45, 48, 54, and 64 KIAS, respectively. Section 5.8, "Rate of Climb," stated that the published climb rate at maximum gross weight, flaps retracted, full throttle, airspeed of 58 KIAS, and 60° outside air temperature would be 629 ft per minute (fpm) at sea level and 592 fpm at 1,000 ft mean sea level (msl).

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KVCB,109 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	138°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	30°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	18°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Vacaville, CA (VCB)	**Type of Flight Plan Filed:**	None
Destination:	Vacaville, CA (VCB)	**Type of Clearance:**	None
Departure Time:	08:52 Local	**Type of Airspace:**	Class G

At 0853, a recorded weather observation at VCB, located about 13 miles southeast of the accident site, revealed that the wind was from 030° at 5 knots, visibility 10 statute miles, clear sky, temperature 64°F, dew point 52°F, and an altimeter setting of 29.95 inches of mercury.

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:**	38.540279,-122.142776

Examination of the accident site revealed that the airplane impacted terrain on an approximate 194° heading and came to rest upright in the northern area of Little Portuguese Canyon on Lake Berryessa at an elevation of about 440 ft msl. All major structural components of the airplane were located at the accident site. The fuselage, right wing, and a portion of the empennage were located on the shoreline along a steep embankment, and the outboard portion of the left wing and left side of the empennage were partially submerged in water. A large area of freshly disturbed dirt was observed immediately in front of the right wing. No damage was observed to the surrounding vegetation and trees immediately in front of the right wing or behind (upslope) of the wreckage.

Examination of the fuselage revealed that the fuselage structure, engine nacelle, and wing center section were crushed downward and displaced laterally to the left. The canopy structure was displaced from the airplane and located adjacent to the wreckage. The forward portion of the cockpit area exhibited significant impact damage with most of the instrument panel separated. The empennage structure was separated from the airframe just forward of the vertical stabilizer; however, it remained attached via control cables. The ballistic parachute handle was partially extended, and the pin was removed. The parachute and rocket were intact and not deployed.

The wreckage was recovered to a secure location for further examination; both wings and empennage were removed to facilitate transport of the wreckage.

The roof structure of the fuselage, which included the wing mounts, was crushed downward and slightly rotated right about 10° and was shifted laterally to the left. The engine remained attached to the fuselage structure. The right sea wing exhibited impact damage and was fractured throughout. The left sea wing exhibited impact damage, was partially separated from the fuselage, and was displaced upward. One of the propeller blades was embedded in the left sea wing. Both main landing gears appeared to be in the "up" position. Both wing lock mechanisms were in the "locked" position.

Rudder control continuity was established from the rudder pedals aft to the area of the separated portion of the empennage. Aileron control continuity was established from the left and right control sticks to the wing root bell crank (cables continuous). The right side aileron bell crank was pulled away from its mount with the cables still attached, consistent with impact damage. Elevator control continuity was established from the control sticks to the separated portion of the empennage.

The right wing leading edge to the wing root remained attached to the wing structure. The wing structure aft of the aileron bell crank at the wing root was separated, extending aft at a 45° angle to about 18 inches outboard of the wing root. The separated portion of the wing structure remained attached to the fuselage. The leading edge exhibited impact damage throughout its span. The flap remained attached via the center and outboard mount. The aileron remained attached via the inboard mount. Flight control continuity to the aileron was established from the wing root bellcrank to the aileron.

The left wing was fractured in half from the leading edge (at the flap/aileron junction) extending outboard at an approximate 45° angle outboard to the trailing edge. The aileron was separated into two pieces. The inboard section remained attached to the inboard mount. The outboard portion of the aileron was separated just outboard of the inboard mount and separated from the middle and outboard mounts. Flight control continuity was established from the wing root aileron bellcrank to the aileron.

The rudder and elevator remained attached to their respective mounts. Flight control continuity of the rudder and elevator was established from the area of separation. Both left and right elevator tips were in the "locked" position.

The engine remained intact and attached to the airframe. The crankshaft was partially rotated by the propeller; however, rotation was limited due to one propeller blade being embedded in the left sea wing. The embedded propeller blade exhibited chordwise striations on the front and aft sides of the blade tip.

Medical and Pathological Information

According to the Napa County Coroner's autopsy report, the pilot's cause of death was "multiple blunt impact injuries," and the manner of death was "accident."

The FAA's Bioaeronautical Sciences Research Laboratory conducted toxicology tests on specimens from the pilot. The results were negative for all tests performed.

Administrative Information

Investigator In Charge (IIC):	Cawthra, Joshua
Additional Participating Persons:	Jeffrey Snider; Federal Aviation Administration; Sacramento, CA Shane Sullivan; Icon Aircraft Company; Vacaville, CA
Original Publish Date:	August 7, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=95127