Aviation Investigation Final Report

Location:	Cataldo, Idaho	**Accident Number:**	WPR13FA380
Date & Time:	August 18, 2013, 19:30 Local	**Registration:**	N9028Q
Aircraft:	NELSON KR-2	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The experimental/amateur built airplane was being operated by the pilot as a personal local flight. The airport manager reported that, in previous conversations, the pilot had told him that he was interested in practicing spins and other maneuvers in the airplane and that he had directed the pilot to a known practice area for the airport. Witnesses reported seeing the airplane spiraling toward the ground in the distance, and, although they did not see the impact, they were concerned, so a search for the airplane was initiated, and the wreckage was located in the area where the airport manager had directed the pilot.

A video-recording device found in the airplane contained a digital file that captured the accident flight from taxi to impact. The video showed the pilot initiating an intentional left spin. During the first few rotations, the engine quit, and the propeller stopped turning. After several additional rotations, the spin stabilized but the airplane continued its descent about 20-degrees nose down until impact. During the descent, the pilot was observed applying various control inputs without effect.

The airplane had been modified from the original design specifications and was equipped with a heavier engine than the engine recommended by the kit manufacturer. The kit manufacturer reported that, if the airplane was built to the manufacturer's specification and engine recommendation, the airplane had spin and recovery characteristics similar to low-wing airplanes. However, due to the modifications on the accident airplane, the spin characteristics were unknown. Regardless, the airplane had not been test flown for spins.

Probable Cause and Findings

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

The pilot's decision to intentionally enter a spin in the airplane, which had unknown spin characteristics due to the engine modification, from which he was unable to recover.

Findings

Aircraft	(general) - Capability exceeded
Aircraft	(general) - Attain/maintain not possible
Personnel issues	Decision making/judgment - Pilot

Factual Information

History of Flight

Maneuvering-aerobatics	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On August 18, 2013, about 1930 Pacific daylight time, a Nelson KR2, amateur-built experimental airplane, N9028Q, sustained substantial damage when it collided with trees and terrain, about four miles west of Cataldo, Idaho. The airplane was being operated by the pilot as a personal local flight, under the provisions of 14 Code of Federal Regulations Part 91. The pilot received fatal injuries. Visual meteorological conditions prevailed at the time of the accident. The flight departed the Shoshone County Airport (KS83), Kellogg, Idaho, about 1900.

According to the local Sheriff's Office, witnesses had seen the airplane spiraling toward the ground in the distance, and although they did not see the impact were concerned for the well-being of the pilot. A search for the airplane was initiated, which resulted in the wreckage being located by local residents and a law enforcement helicopter.

A video recording device found at the accident site was retained by the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), for further examination by the NTSB Vehicle Recorder Division.

Witnesses interviewed at the Shoshone County Airport reported that on previous occasions the pilot had asked about airspace where he might practice spin recoveries, or mild aerobatics. The area of the accident was near the local practice area.

No pilot or airplane logbooks were discovered for examination.

Pilot Information

Certificate:	Private	**Age:**	67
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	March 29, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 305 hours (Total, all aircraft), 1 hours (Total, this make and model)		

The pilot, age 67, held a private pilot certificate with a rating for airplane single-engine land. He was issued a third-class Federal Aviation Administration (FAA) airman medical certificate without limitations on March 29, 2012.

No personal flight records were discovered for the pilot, and the aeronautical experience listed in this report was obtained from a review of the airman's FAA records on file in the Airman and Medical Records Center in Oklahoma City. On the pilot's most recent application for an airman medical certificate, dated March 29, 2012, he indicated that his total aeronautical experience consisted of about 305 hours, of which he listed 0 hours accrued in the previous 6 months.

Aircraft and Owner/Operator Information

Aircraft Make:	NELSON	**Registration:**	N9028Q
Model/Series:	KR-2	**Aircraft Category:**	Airplane
Year of Manufacture:	1980	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	1071
Landing Gear Type:	Retractable - Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	April 3, 2013 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	CONT MOTOR
ELT:	C91A installed, activated, aided in locating accident	**Engine Model/Series:**	A&C75 SERIES
Registered Owner:	John Lippis	**Rated Power:**	75 Horsepower
Operator:	John Lippis	**Operating Certificate(s) Held:**	None

The airplane was an experimental/amateur-built Nelson KR2, N9028Q, manufactured in 1980, and equipped with a Continental Motors A-75 series engine.

No airframe or engine logbooks were discovered for examination. However, the aircraft mechanic who performed the last required annual condition inspection provided documentation showing that the last condition inspection was completed on April 3, 2013, and at the time of the inspection the airplane had accrued 519.9 hours of total airframe flight/operating time.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Kellog, ID (KS83)	**Type of Flight Plan Filed:**	None
Destination:	Kellog, ID (KS83)	**Type of Clearance:**	None
Departure Time:	19:00 Local	**Type of Airspace:**	

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:**	47.542221,-116.409446

On August 19, the wreckage was examined at the crash site by the NTSB IIC, accompanied by an FAA aviation safety inspector. The airplane had descended near vertically through dense trees and brush to impact with terrain. It came to rest upright on a moderately steep slope. The left wing and empennage were severed from the airplane, but the control cables remained intact, and control continuity was established. All of the major components, flight control surfaces, and structural members were present at the accident site. The impact site was 40 to 50 feet in diameter.

Medical and Pathological Information

A postmortem examination of the pilot was performed under the authority of the Spokane County

Medical Examiner, Spokane, Washington, on August 20, 2013. The examination revealed that the cause of death was attributed to blunt force injuries associated with an airplane accident.

A toxicological examination by the FAA's Civil Aeromedical Institute (CAMI) on September 19, 2013, was negative for any alcohol or drugs.

Additional Information

On-board Video Recorder

During the examination of the airplane at the accident site, the IIC located a Contour Roam 2 video recorder in the wreckage. The camera was sent to the NTSB Vehicle Recorder Laboratory in Washington, DC for examination.

The examination revealed that the video recorder was undamaged, and contained numerous video files. The two most recent files pertained to the accident flight. The recorder was mounted in the airplane at the rear of the cabin/cockpit, essentially looking over the pilot's right shoulder. The instrument panel and some flight controls are visible in the foreground, with the pilot on the left.

The first file, FILE0005.mp4, was 2 minutes and 39 seconds in length, and recorded the pilot starting the airplane. The airplane does not have an electric starter, and the video captured the pilot hand propping the airplane. The pilot was outside the airplane in this video.

The second file, FILE0006.mp4, was 3 hours and 47 minutes in duration, and captured the accident flight from taxi to the impact at the accident site.

Essentially, the first part of the flight was uneventful with the pilot performing some turns and steep banked maneuvers. Upon reaching the geographical area where the accident occurred, the pilot initiated an intentional spin, throttling the engine to idle, pulling on the carburetor heat, and increasing the nose up attitude of the airplane until it stalled and entered a spin to the left. During the first few rotations the engine quit, and the propeller stopped turning. After several rotations the spin stabilized about 20 degrees nose down, and remained in the steady state until impact. During the descent the pilot was observed attempting various control inputs without effect.

Airplane design

The KR 2 was originally designed by Rand Robinson Engineering. The prototype was completed in late May of 1974, and the first flight was on June 1. The airplanes are either plans or kit built, and may be equipped in a tailwheel configuration with retractable landing gear, or tricycle fixed landing gear. The original design specifications called for a 1600 to 1700 cubic centimeter Volkswagen engine.

Current manufacturing rights of the KR 2 airplane belong to nVAero, Mission Viejo, California.

Spin Characteristics

During a telephone conversation with the NTSB IIC on October 15, the owner of nVAero stated that he was aware of the accident airplane, and knew that the airplane was equipped with a Continental aircraft engine. He said the Continental engine is heavier than the recommended VW engine. He further stated that he had spun other KR 2 airplanes in the past, and that the spin and recovery characteristics of the "stock" airplanes (meaning plans/kit built airplanes adhering closely to build specification and engine recommendations) were similar to other low-wing light airplanes. He said due to the modifications on the accident airplane, he could not speak to its spin characteristics.

FAA Documents

Experimental Amateur-Built airplanes are issued Special Airworthiness Certificates. The accident airplane's Special Airworthiness Certificate was issued on August 14, 2012. Prior to the issuance of the certificate, the builder must provide a statement of Experimental Operating Limitations for Phase I and Phase II of the flight test period, as prescribed in FAA Order 8130.2G, change 1, dated 7/2/2012.

The accident airplane's statement of limitations includes aerobatic maneuvers for which the airplane had been test flown. A spin is an aerobatic maneuver. The accident airplane was test flown for wing-overs, rolls, and loops, but was not test flown for spins. A copy of the Airplane's Operating Limitations is attached to the docket for this report.

Administrative Information

Investigator In Charge (IIC):	Lewis, Lawrence
Additional Participating Persons:	Michael Donaldson; FAA FSDO; Spokane, WA
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Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=87820