Aviation Investigation Final Report

Location:	Boerne, Texas	**Accident Number:**	CEN15FA032
Date & Time:	October 28, 2014, 14:33 Local	**Registration:**	N70PM
Aircraft:	LANGSTON, FREDERICK L RV 4	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was flying his experimental, amateur-built airplane at an altitude between 500 and 800 ft above ground level when several witnesses heard the engine sounds suddenly stop. The airplane then entered a steep bank toward a nearby airstrip, descended, and disappeared from view. The airplane impacted thickly-wooded, rocky terrain and came to rest upright about 100 ft from the edge of the runway. Although the airplane was destroyed by post-crash fire, examination of the wreckage revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. The weather conditions at the time of the accident were conducive to the formation of carburetor icing at cruise power and a potential for serious carburetor icing at glide power; however, it could not be determined if or to what extent the engine may have accumulated carburetor ice.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
A total loss of engine power for reasons that could not be determined, because post accident examination did not reveal any mechanical malfunctions or anomalies that would have precluded normal operation.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Maneuvering	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)
Post-impact	Fire/smoke (post-impact)
Post-impact	Explosion (post-impact)
Post-impact	Cabin safety event

HISTORY OF FLIGHT

On October 28, 2014, about 1433 central daylight time, an experimental, amateur-built RV-4, N70PM, was destroyed during an off-airport forced landing near John Henry Key Airport (7TA8), Boerne, Texas. The pilot, who was the sole occupant, was fatally injured. The airplane was registered to and operated by the pilot. Day visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed for the 14 *Code of Federal Regulations* Part 91 local, personal flight. The airplane departed from Boerne Stage Field Airport (5C1), Boerne, Texas at an unknown time.

Several witnesses reported that the airplane was maneuvering between 500 and 800 ft above ground level when the engine sounds suddenly stopped. The airplane then entered a steep bank, began flying toward 7TA8, descended, and disappeared from their view. The airplane impacted trees and terrain and came to rest upright about 100 feet from the edge of runway 22 at 7TA8. There was an immediate postimpact fire that consumed much of the airplane. The pilot initially survived the accident, but succumbed to his injures the following day.

PERSONNEL INFORMATION

The pilot, age 70, held a Federal Aviation Administration (FAA) private pilot certificate with ratings for airplane single-engine land and instrument airplane. His most recent third-class FAA medical certificate was issued on September 25, 2014, with the restriction that he must have glasses available for near vision.

Complete copies of the pilot's personal flight records were not available for examination; however, review of the pilot's most recent logbook indicated that he had 1,687 hours of total flight experience. The pilot's flight experience in the accident airplane make and model was about 50 hours, with 10.6 of those flight hours accumulated within the previous three months. The pilot's most recent flight review was completed on January 16, 2013.

AIRCRAFT INFORMATION

The airplane was issued an FAA special airworthiness certificate on March 2, 2013. The low-wing, fixed conventional landing gear, single-engine airplane was powered by a 155-horsepower Lycoming O-320-

D2J carbureted engine, which drove a Performance Propellers, Inc. model 70/70, 2-bladed, fixed-pitch, wood propeller. The airplane was of conventional aluminum construction with a cantilever low-wing, conventional tail surfaces, and a 2-seat tandem cockpit, which was accessed through a hinged canopy. A maintenance logbook entry showed the airplane had an empty weight of 939 pounds and a maximum gross weight of 1,500 pounds. The airplane's most recent condition inspection was completed on May 12, 2014, at an aircraft total time of 23.7 hours.

Review of the aircraft logbook, engine logbook, pilot logbook entries and other records indicated that. at the time of the accident, the airplane had accumulated a total time of 50.1 hours, and the engine had accumulated a total time of 1,825.1 hours.

METEOROLOGICAL INFORMATION

At 1435, the automated weather observation system at 5C1, about 8 miles south of the accident site, reported wind from 200 degrees at 3 knots, visibility 10 miles, scattered clouds at 2,800 ft, temperature 27°C, dew point 17°C, with an altimeter setting of 30.03 inches of mercury. Review of a carburetor icing probability chart showed the potential for icing at cruise power and a potential for serious icing at glide power.

AIRPORT INFORMATION

7TA8 was a non-towered airport with a field elevation of 1,400 ft msl. The only runway was 4/22, which was a turf runway 2,300 ft long by 100 ft wide. The airport was surrounded by rugged hilly terrain, with much of the area thickly wooded.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted densely-wooded, hilly terrain on a south-southwesterly heading at an estimated elevation about 1,400 ft msl. The impact location was about 200 ft northwest of the runway 22 at 7TA8.

The first impact was to upper branches of cedar trees at about 8 ft above ground level. Both impact-separated propeller blades were found nearby. Ground scars, wreckage debris, and numerous broken branches littered the area along a wreckage distribution path of about 145°.

All flight control surfaces and all major components of the airplane were accounted for at the accident site. The main wreckage came to rest upright about 89 ft from the initial tree impact. The tip of the left wing was oriented about 190°, and the partially-separated upright fuselage was oriented about 300°. The engine and engine mount remained connected to the forward firewall. The engine and forward firewall were adjacent to the forward fuselage, which was almost completely separated from the fuselage by fire damage. The hub of the wood propeller remained attached to the propeller flange on the engine crankshaft, but was partially consumed by fire.

The empennage and tail surfaces were completely separated from the airplane, and came to rest partially inverted about 10 ft northwest of the engine. The vertical stabilizer had leading edge impact damage at the root. No significant impact damage was observed to the horizontal stabilizer. The elevator, rudder, and rudder trim tab remained attached. The tail wheel remained attached.

The impact-damaged right wing was mostly consumed by fire, and the right aileron remained partially attached.

The leading edge of the outboard left wing showed impact crushing damage consistent with a 70°nose-down impact angle. The left aileron exhibited impact crushing damage to the inboard trailing edge consistent with impact with a tree. The outer portion of the left wing was not consumed by fire. During wreckage removal, about 2 gallons of clean blue liquid consistent with 100LL aviation fuel (AVGAS) drained from the wing into a clean bucket. No debris or water contamination was observed. The fuel caps on both wings were secure.

The left flap was observed in the full-down position. The position of the right flap could not be determined because of fire and impact damage.

The flight control linkages and engine controls were examined. Severe impact and thermal damage prevented a confirmation of preimpact control continuity; however, all of the control linkage separations examined appeared consistent with impact damage.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Bexar County Medical Examiner's Office in San Antonio, Texas. The conclusion was that the pilot died as a result of conflagration injuries sustained in the airplane crash.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the pilot. Lorazepam, midazolam, morphine, norketamine, and propofol was detected. These medications were traced to the pilot's post-accident hospital care. Testing also detected cetirizine, an over-the-counter antihistamine, in liver and blood; however, the amount of cetirizine detected was too low to quantify.

TESTS AND RESEARCH

The wreckage was moved to another location for further engine examination. The engine and accessories sustained impact, fire, and heat damage. The exhaust system and induction system displayed significant heat and impact damage. The carburetor had separated on impact and also displayed thermal damage. All fluid-carrying lines in the engine compartment were fire-damaged. The oil system was impact- and fire-damaged. Severe thermal damage to the engine prevented a useful examination of the magnetos, fuel pump, carburetor, or any other components. On first attempts, the engine would not rotate. After engine accessories were removed, the engine was partially disassembled to facilitate another attempt to rotate the engine. The crankshaft and valve train then rotated freely with no interference.

Pilot Information

Certificate:	Private	**Age:**	70,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	September 25, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 16, 2013
Flight Time:	(Estimated) 1687 hours (Total, all aircraft), 50 hours (Total, this make and model), 1636 hours (Pilot In Command, all aircraft), 10 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	LANGSTON, FREDERICK L	**Registration:**	N70PM
Model/Series:	RV 4	**Aircraft Category:**	Airplane
Year of Manufacture:	2013	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	2748
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	May 12, 2014 Condition	**Certified Max Gross Wt.:**	1500 lbs
Time Since Last Inspection:	26 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	50 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C126 installed, not activated	**Engine Model/Series:**	O-320-D2J
Registered Owner:	On file	**Rated Power:**	155 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	K5C1,1385 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	14:35 Local	**Direction from Accident Site:**	156°
Lowest Cloud Condition:	Scattered / 2700 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.03 inches Hg	**Temperature/Dew Point:**	27°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Boerne, TX (5C1)	**Type of Flight Plan Filed:**	None
Destination:	Boerne, TX (5C1)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	JOHN HENRY KEY 7TA8	**Runway Surface Type:**	Grass/turf
Airport Elevation:	1400 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	22	**IFR Approach:**	None
Runway Length/Width:	2300 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	29.849445,-98.737777(est)

Administrative Information

Investigator In Charge (IIC):	Latson, Thomas
Additional Participating Persons:	Henry Kifer; FAA San Antonio FSDO; San Antonio, TX John Butler; Lycoming Engines; Williamsport, PA
Original Publish Date:	April 20, 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=90321