



# Aviation Investigation Final Report

<b>Location:</b>	Viborg, South Dakota	<b>Accident Number:</b>	CEN16FA344
<b>Date &amp; Time:</b>	September 2, 2016, 10:00 Local	<b>Registration:</b>	N676DT
<b>Aircraft:</b>	AVES DOUGLAS JAMES RV 6	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The commercial pilot and the passenger, his 14-year-old granddaughter who wanted to become a pilot, were making a local flight in the airplane. No radar or GPS track information was found for the flight. A witness heard the airplane's engine "sputtering" before the airplane impacted the ground in a cornfield. A postimpact fire consumed the engine cowling, cockpit, fuselage, and the forward portion of the empennage. Damage to the airplane, the crop, and marks on the ground indicated that the airplane impacted in a slightly nose-low and left-wing-low attitude with no forward airspeed, consistent with a relatively flat spin. The propeller remained attached to the engine and was embedded in the soil and positioned horizontally. The propeller blades were slightly bent aft and did not exhibit any leading-edge damage, consistent with minimal, if any, power being produced by the engine during impact. No mechanical malfunctions or anomalies were found with the engine or airframe that would have precluded normal operation. However, the examination was limited by the extensive postcrash fire damage.

The circumstances of the accident are consistent with the airplane exceeding its critical angle of attack, resulting in an aerodynamic stall and subsequent flat spin into terrain. Given the witness report of a "sputtering" engine and the propeller signatures consistent with the engine not producing power at impact, it is likely that the engine lost power before impact. However, it could not be determined whether the engine lost power before the loss of control or whether the pilot intentionally reduced power during the descent.

The 14-year-old passenger was seated in the left seat, and the pilot was seated in the right seat. Although the family reported that the flight was not instructional, it is possible that the pilot allowed the passenger to manipulate the flight controls. Regardless of which occupant was manipulating the flight controls, the pilot was the only certificated pilot on board and was responsible for the safety of the flight.

## 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 airplane control, which resulted in the airplane exceeding its critical angle  
of attack, an aerodynamic stall, and subsequent flat spin into terrain.

## Findings

<b>Personnel issues</b>	Aircraft control - Pilot
<b>Aircraft</b>	Angle of attack - Not attained/maintained
<b>Aircraft</b>	Airspeed - Not attained/maintained

## Factual Information

### History of Flight

Unknown	Loss of control in flight (Defining event)
Unknown	Aerodynamic stall/spin

On September 2, 2016, about 1000 central daylight time, an experimental, amateur-built RV-6 airplane, N676DT, impacted a cornfield following a loss of control near Viborg, South Dakota. The commercial pilot and the passenger were fatally injured, and the airplane was destroyed. The airplane was registered to and operated by the pilot under the provisions of 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed, and no flight plan had been filed. The local flight departed from Marv Skie-Lincoln County Airport (Y14), Tea, South Dakota, about 0900.

Family members reported that the passenger was the pilot's 14-year-old granddaughter, who aspired to become a pilot, and that it was very common for them to take local flights on the weekends. They added that the purpose of the flight was personal and not instructional.

A witness reported hearing an engine "sputtering," followed by a loud "thud," and then he observed a fireball. The witness did not see the airplane in flight.

### Pilot Information

Certificate:	Commercial	Age:	64, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	4-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:	February 19, 2016
Occupational Pilot:	No	Last Flight Review or Equivalent:	May 16, 2015
Flight Time:	(Estimated) 2272 hours (Total, all aircraft)		

## Passenger Information

Certificate:	Age:	14,Female
Airplane Rating(s):	Seat Occupied:	Left
Other Aircraft Rating(s):	Restraint Used:	4-point
Instrument Rating(s):	Second Pilot Present:	No
Instructor Rating(s):	Toxicology Performed:	No
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot: No	Last Flight Review or Equivalent:	
Flight Time:		

## Aircraft and Owner/Operator Information

Aircraft Make:	AVES DOUGLAS JAMES	Registration:	N676DT
Model/Series:	RV 6	Aircraft Category:	Airplane
Year of Manufacture:	1996	Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	22759
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	February 18, 2016 Condition	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	389.9 Hrs as of last inspection	Engine Manufacturer:	Lycoming
ELT:	Not installed	Engine Model/Series:	O-360-A1A
Registered Owner:		Rated Power:	180 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

The airplane was built from a kit by a previous owner, and it was configured for two occupants with side-by-side seating. The airplane received a special airworthiness certificate with an experimental designation on September 11, 1996.

The investigation was unable to determine when the airplane had been fueled last.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KYKN, 1180 ft msl	<b>Distance from Accident Site:</b>	18 Nautical Miles
<b>Observation Time:</b>	09:55 Local	<b>Direction from Accident Site:</b>	188°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	12 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	150°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.17 inches Hg	<b>Temperature/Dew Point:</b>	19°C / 13°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	TEA, SD (Y14 )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	TEA, SD (Y14 )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	09:00 Local	<b>Type of Airspace:</b>	Unknown

There were no active AIRMETs or SIGMETs near the accident location. Also, there were no PIREPS applicable to the accident area.

## Airport Information

<b>Airport:</b>	MARV SKIE-LINCOLN COUNTY Y14	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	1515 ft msl	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	On-ground
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	43.170833,-97.300552

The accident site was located in a mature cornfield about 10 nautical miles west of Viborg and 27 nautical miles southwest of Y14. The airplane came to rest on top of the corn stalks, some of which

remained unbroken near the empennage. The wreckage exhibited no lateral or forward displacement. Outside of the wreckage area there was no airplane debris and no noticeable damage to the crop. According to first responders, the passenger was seated in the left seat and her 4-point seatbelt remained fastened. The pilot was seated in the right seat and his 4-point seatbelt remained fastened.

The engine cowling, cockpit, fuselage, and forward portion of the empennage were consumed by a postimpact fire (figure 1).



Figure 1 – The main wreckage viewed from the front

The wing roots and bottom side of the fuselage were thermally damaged. The wing tank fuel caps were found in place and secure.

The left wing tip fairing separated from the wing and was found near the forward left side of the wreckage. The left wing exhibited rearward and upward impact crushing signatures (figure 2). Impact

marks were found under the left wing tip. The left flap was partially underneath the left wing and remained attached at the connection points. The left aileron remained partially attached to the wing; the inboard connection remained attached while the outboard connection was impact separated. The left fuel tank was breached.



Figure 2 – Left wing impact damage

The right wing sustained leading edge damage and rearward crushing near the inboard section. The right flap was retracted and mostly undamaged. The right aileron was found in a neutral position, remained attached, and was mostly undamaged.

The aileron control tubes remained attached to the aileron surfaces and were continuous inboard to the fuselage where they were both consumed by fire.

The elevator control tube remained attached to the elevator surface and extended about 4 ft into the rear

fuselage where it was thermally damaged and partially consumed by fire. The forward portion of the elevator control tube remained attached to its connection at the control stick. The elevator trim tab was slightly down from the neutral position. The rudder control cables remained attached to each side of the rudder. The rudder control cables were continuous to the forward ball swage in the cockpit area, and the right ball swage was covered with melted aluminum. The rudder pedals were found in the forward cockpit near the firewall and sustained thermal damage and impact damage.

The throttle and mixture control knobs were near the full forward position. The cockpit instrumentation was mostly consumed by fire. The ignition was positioned to "BOTH." The fuel selector was set to the right fuel tank position.

The two-bladed metal propeller remained attached to crankshaft flange. The propeller was embedded in the soil and positioned horizontally (figure 3). The propeller blades were slightly bent aft and did not exhibit any leading edge damage.



Figure 3 – The engine and propeller

The engine remained attached to the engine mounts and sustained thermal damage primarily near the

rear, which encompassed the engine accessories. The top spark plug electrodes, which were all automotive style plugs, were free of damage and exhibited coloration consistent with normal operation. The empennage and exhaust manifold did not contain any visible oil residue. Engine mechanical continuity was established from the vacuum pump drive to the propeller flange. When the crankshaft was rotated via the accessory drive gear, thumb compression and suction were obtained at each cylinder. The valve rockers were undamaged and exhibited movement consistent with normal operation. The magneto drive gear in the accessory section and fuel pump plunger actuated when the accessory drive gear was rotated. The engine driven fuel pump was thermally damaged. The carburetor remained secure on its mounting pad with the mixture and throttle controls secure at their respective connections. The carburetor throttle control was near the full open position, and the mixture was near the full rich position. The carburetor fuel inlet screen was free of contaminants. The carburetor air inlet was free of obstruction. The carburetor was removed and opened for examination, which revealed that the float bowl remained free of contamination and the plastic floats were thermally damaged. The left and right electronic ignition components were thermally damaged. The ignition harness was mostly consumed by fire; however, it appeared to have been connected at each spark plug. The vacuum pump remained secure to its mounting pad, and the plastic coupler was thermally damaged. The engine oil suction screen was free of contaminants.

The postaccident examination of the engine and airframe did not reveal any mechanical malfunctions or anomalies that would have precluded normal operation. The postimpact fire prevented a complete examination of the airplane.

## **Additional Information**

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A review of FAA radar data for the accident area did not reveal any radar returns that correlated to the flight. Also, there were no air traffic control communications found from the airplane.

An undamaged Appareo Stratus PRX V2 was found near the wreckage. The unit was downloaded by the NTSB Recorders Laboratory and did not reveal any data from the accident flight.

The pilot's iPad was found by the family, and the ForeFlight application revealed 37 previous flight track logs. The track logs were from November 29, 2014 to July 26, 2016.

## **Medical and Pathological Information**

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The Sanford Health Pathology Clinic, Sioux Falls, South Dakota, completed an autopsy on the pilot, and the cause of death was multiple blunt force injuries. The Federal Aviation Administration's (FAA) Bioaeronautical Sciences Research Laboratory conducted toxicology testing, which revealed verapamil and norverapamil in the blood and liver.

Verapamil is a prescription drug used in the treatment of hypertension, angina, and arrhythmias. Norverapamil is a metabolite of verapamil.

The Sanford Health Pathology Clinic also completed an autopsy on the passenger, and the cause of death was blunt force injury. The FAA's Bioaeronautical Sciences Research Laboratory conducted toxicology testing, which was negative for carbon monoxide in the blood.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Lindberg, Joshua
<b>Additional Participating Persons:</b>	Brandon Caneva; Federal Aviation Administration; Rapid City, SD Mark Platt; Lycoming Engines; Williamsport, PA
<b>Original Publish Date:</b>	August 2, 2017
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=93937">https://data.ntsb.gov/Docket?ProjectID=93937</a>

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).