



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

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|--------------------------------|--------------------------------------|-------------------------|-------------|
| Location: | Fordyce, Arkansas | Accident Number: | CEN24LA056 |
| Date & Time: | December 5, 2023, 16:45 Local | Registration: | N600VS |
| Aircraft: | Vans RV6 | Aircraft Damage: | Substantial |
| Defining Event: | Loss of engine power (partial) | Injuries: | 2 Minor |
| Flight Conducted Under: | Part 91: General aviation - Personal | | |

Analysis

The two pilots who had just purchased the experimental airplane planned to fly it without a recent condition inspection and without a ferry permit to their home airport. During the flight, the airplane sustained a partial loss of engine power. They diverted the flight to an alternate airport, where they attempted to land the airplane. They were unable to extend the wing flaps during the approach for landing and performed a forward slip to decrease altitude. The airplane touched down about halfway down the runway and then overran the runway departure end, where it nosed over in a grass area.

Postaccident examination of the airplane revealed that the airplane's two 12V automotive batteries would not start the engine. However, the engine would start and operate when connected to an operational external battery and the fuel pump turned on. The engine would not start or operate at rated power without the fuel pump operating. An engine-driven fuel pump was not installed on this engine.

It is likely that the alternator was not charging the batteries during the accident flight, and the engine ignition and pump were being operated on battery voltage, which was eventually depleted below the engine's operating tolerances. Also, the failure of the flaps to extend was likely related to the low battery voltage. A recent and proper condition inspection would have likely found and corrected any electrical system faults.

Probable Cause and Findings

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

The pilot's failure to attain a proper touchdown point following an unidentified electrical system failure and subsequent partial loss of engine power, which resulted in a runway overrun and impact with terrain. Contributing to the accident was the pilot's decision to operate the airplane in an unairworthy condition.

Findings

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|-------------------------|---|
| Aircraft | AC generator-alternator - Failure |
| Aircraft | Descent/approach/glide path - Not attained/maintained |
| Personnel issues | Decision making/judgment - Pilot |
| Personnel issues | Decision making/judgment - Copilot |

Factual Information

History of Flight

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|----------------|---|
| Enroute-cruise | Loss of engine power (partial) (Defining event) |
| Landing | Runway excursion |

On December 5, 2023, about 1645 central standard time, an experimental, amateur-built Vans RV6A airplane, N600VS, was substantially damaged when it was involved in an accident near Fordyce, Arkansas. The two pilots received minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

A private pilot and a flight instructor had purchased the airplane and planned to fly it to their home airport in Mississippi from Durant Regional Airport (DUA), Durant, Oklahoma. The private pilot stated that the airplane did not have a current regulatory condition inspection. The private pilot stated that he attempted to obtain a ferry permit for the flight, but after being unable to reach the Oklahoma Flight Standards District Office, he decided not to pursue obtaining a ferry permit.

The flight instructor, who was the pilot flying, reported that at 7,500 ft mean sea level (msl), with the autopilot on, the airplane was “running great.” About one minute after the cabin heat was turned on, the engine sound decreased, and the tachometer indication went to zero rpm. They turned the cabin heat off, checked the circuit breakers, and turned on the fuel boost pump. The fuel gauges indicated that both tanks were more than half full. They diverted the flight to Fordyce Municipal Airport (5M4), Fordyce, Arkansas, to attempt a landing on runway 5 (3,183 ft by 60 ft, dry asphalt). With the autopilot disengaged, they descended toward 5M4 at an airspeed of about 65 knots. About 2,000 ft msl, the engine was still sputtering so they reduced the throttle to idle, turned off the fuel boost pump, and turned off the master switch, but the engine continued to sputter. They continued to descend and maneuvered the airplane onto final approach, and then turned the master switch back on. They were unable to extend the electric flaps so they performed a forward slip in an attempt to descend. They discontinued the slip about 1,500 ft down the runway, then landed with about 500 ft of runway remaining and were unable to stop; they overran the runway and nosed over in the grass.

The private pilot reported they were in cruise flight about 7,500 ft msl and about 178 knots indicated airspeed with “no signs of abnormal operation or any indication of faulty systems.” Next, the primary tachometer on the electronic flight instrument system (EFIS) indicated 4,500 rpm and shortly after indicated zero rpm. Then the standby tachometer indicated zero rpm as the airspeed decreased to 160 knots and continued to decrease. They selected the left fuel tank and turned on the fuel pump, which resulted in a slight rpm increase followed by a loss of

power. They elected to land at the nearest airport, 5M4, and attempted to shut down the engine, but it continued to sputter with partial power. They turned the electrical power back on in attempt to extend the electric flaps, but they would not extend. They were still too fast, so they completed two S-turns on the base leg, and a forward slip during final approach. The airplane touched down about 2,500 ft down the 3,183 ft runway. The airplane then went off the end of the runway and nosed over.

The Federal Aviation Administration inspector reported that the airplane came to rest inverted about 100 yards from the end of the runway and sustained substantial damage to the fuselage and empennage.

Postaccident examination revealed that the airplane was equipped with an experimental automotive engine. There were two 12-volt car batteries mounted in the engine compartment. The positive cable on the right battery was not tight and could be moved with light finger pressure. There was no independent ignition system installed.

An external power source was used to supply DC voltage to the batteries to facilitate powering the airplane's electrical system. The electrical panel featured a three-position, momentary up/down toggle switch for the flap position control circuit, with the center position being OFF. The momentary up/down switch would drive the flap motor and when released it automatically returned to the center OFF position. The flap circuit was tested and verified operational, and the flap position switch was actuated in all three positions. In the center position, no voltage was supplied, in the up position there was 12V present, and in the down position, there was 12V present, but the polarity was reversed. The engine-driven automotive alternator charging function could not be verified.

With the avionics master switch on, the fuel quantity indicators were operational. The left tank indicated half full, and the right tank indicated empty. The fuel selector valve was found in the left tank position. The electric fuel pump was tested and verified operational. There was no engine-driven fuel pump installed.

The spark plugs were removed from all cylinders. The engine starter was energized with the ignition switch in the on position, and a spark was verified from each spark plug. All four spark plugs were clean with no oil burning or carbon fouling present.

With external battery power supplied, an engine start was attempted with the ignition on and the fuel pump off. The engine starter cranked the engine, but it would not start. An engine start was then attempted with the fuel pump on and the engine started and operated at an idle setting. A red light labeled "check engine" on the instrument panel was illuminated during the engine operation and through multiple throttle setting changes. A multimeter was used to test for alternator output at the alternator cable; however, only voltage from the external battery was present. With the engine running, the external battery was disconnected from the airplane's main batteries and the engine stopped immediately.

Additional engine test runs were accomplished to determine how the engine would respond if the fuel pump was turned off during operation. There was a decrease in rpm, but the engine operated more than a minute before all fuel was exhausted and the engine stopped.

Co-pilot Information

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| Certificate: | Private | Age: | 29, Male |
| Airplane Rating(s): | Single-engine land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | 4-point |
| Instrument Rating(s): | Airplane | Second Pilot Present: | Yes |
| Instructor Rating(s): | None | Toxicology Performed: | |
| Medical Certification: | Class 1 With waivers/limitations | Last FAA Medical Exam: | October 11, 2023 |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | March 15, 2023 |
| Flight Time: | 250 hours (Total, all aircraft), 2 hours (Total, this make and model), 200 hours (Pilot In Command, all aircraft), 40 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft) | | |

Pilot Information

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|----------------------------------|--|--|---------------|
| Certificate: | Commercial; Flight instructor | Age: | 67, Male |
| Airplane Rating(s): | Single-engine land; Multi-engine land | Seat Occupied: | Right |
| Other Aircraft Rating(s): | Helicopter | Restraint Used: | 4-point |
| Instrument Rating(s): | Airplane; Helicopter | Second Pilot Present: | Yes |
| Instructor Rating(s): | Airplane multi-engine; Airplane single-engine; Helicopter | Toxicology Performed: | |
| Medical Certification: | None With waivers/limitations | Last FAA Medical Exam: | May 1, 2023 |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | March 4, 2023 |
| Flight Time: | 8350 hours (Total, all aircraft), 2 hours (Total, this make and model), 6599 hours (Pilot In Command, all aircraft), 15 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft) | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|-------------------------------|---------------------------------------|-----------------|
| Aircraft Make: | Vans | Registration: | N600VS |
| Model/Series: | RV6 A | Aircraft Category: | Airplane |
| Year of Manufacture: | 2006 | Amateur Built: | Yes |
| Airworthiness Certificate: | Experimental (Special) | Serial Number: | W006 |
| Landing Gear Type: | Tricycle | Seats: | 2 |
| Date/Type of Last Inspection: | May 21, 2020 Condition | Certified Max Gross Wt.: | 1800 lbs |
| Time Since Last Inspection: | 71.9 Hrs | Engines: | 1 Reciprocating |
| Airframe Total Time: | 557.5 Hrs at time of accident | Engine Manufacturer: | Subaru |
| ELT: | Installed, not activated | Engine Model/Series: | EJ25 |
| Registered Owner: | On file | Rated Power: | 175 Horsepower |
| Operator: | On file | Operating Certificate(s) Held: | None |

Meteorological Information and Flight Plan

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| Conditions at Accident Site: | Visual (VMC) | Condition of Light: | Day |
| Observation Facility, Elevation: | KCDH, 132 ft msl | Distance from Accident Site: | 24 Nautical Miles |
| Observation Time: | 17:55 Local | Direction from Accident Site: | 236° |
| Lowest Cloud Condition: | Clear | Visibility | 9 miles |
| Lowest Ceiling: | None | Visibility (RVR): | |
| Wind Speed/Gusts: | / | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 30.22 inches Hg | Temperature/Dew Point: | 12°C / 5°C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | Durant, OK (DUA) | Type of Flight Plan Filed: | None |
| Destination: | Cleveland, MS (RNV) | Type of Clearance: | None |
| Departure Time: | 15:30 Local | Type of Airspace: | Class E; Class G |

Airport Information

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|-----------------------------|------------------|----------------------------------|---------------------------------|
| Airport: | FORDYCE MUNI 5M4 | Runway Surface Type: | Asphalt |
| Airport Elevation: | 193 ft msl | Runway Surface Condition: | Dry |
| Runway Used: | 23 | IFR Approach: | None |
| Runway Length/Width: | 3183 ft / 60 ft | VFR Approach/Landing: | Full stop;Precautionary landing |

Wreckage and Impact Information

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|----------------------------|---------|-----------------------------|----------------------|
| Crew Injuries: | 2 Minor | Aircraft Damage: | Substantial |
| Passenger Injuries: | N/A | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 2 Minor | Latitude, Longitude: | 33.842153,-92.370173 |

Administrative Information

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| Investigator In Charge (IIC): | Lindberg, Joshua |
| Additional Participating Persons: | Greg New; Federal Aviation Administration; Little Rock, AR Mike Jones; Federal Aviation Administration ; Jackons, MS |
| Original Publish Date: | November 21, 2024 |
| Last Revision Date: | |
| Investigation Class: | Class 3 |
| Note: | The NTSB did not travel to the scene of this accident. |
| Investigation Docket: | https://data.nts.gov/Docket?ProjectID=193496 |

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).