

HISTORY OF FLIGHT

On June 27, 2017, about 0849 mountain standard time, a Vans RV-7, N731RV, was destroyed when it impacted terrain about 10 miles southwest of Arlington, Arizona. The airline transport pilot and the pilot-rated passenger sustained fatal injuries. The airplane was owned and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed for the local personal flight, which originated from Buckeye Municipal Airport (B XK), Buckeye, Arizona, about 0835.

After family members of the pilot became concerned when he did not arrive at his intended destination, the Federal Aviation Administration (FAA) issued an alert notice (ALNOT) for the airplane. The wreckage was found by local law enforcement in the Gila Mountains at 1810.

Review of radar data revealed a primary target correlated with the accident airplane about 2.5 miles southeast of B XK at 2,200 ft mean sea level (msl), heading southwest and climbing. At 0844, at 3,349 ft msl, the target turned west and continued to climb. About a minute later, the target had climbed to about 6,700 ft msl and completed a 360° right turn. The target then continued southwest, and at 0847, made a left 180° turn to the northeast at 7,600 ft msl. The target continued along this heading before radar returns were lost at 0849; the last return was near the accident site.

PERSONNEL INFORMATION

The pilot, age 78, held an airline transport pilot certificate with ratings for airplane single- and multi-engine land and single-engine sea. The pilot was issued a third-class FAA medical certificate on March 29, 2016, with a limitation that he must wear corrective lenses. On the application for that medical certificate, the pilot reported 22,510 total hours of flight experience, of which 10 hours were in the previous six months. The pilot also held a flight instructor certificate for multi-engine airplane, flight engineer certificate for turbojet-powered and reciprocating-engine-powered airplanes, and a mechanic certificate with airframe and powerplant ratings.

The passenger held a private pilot certificate with a rating for airplane single-engine land. He was issued a FAA third-class airman medical certificate on August 14, 2015, without limitations. On the application for that medical certificate, he reported flight experience that included 3.2 hours total and 3.2 hours in previous six months.

AIRCRAFT INFORMATION

The RV-4Z is a two-place, tandem-seat, low-wing amateur-built airplane with conventional landing gear powered by a 200-hp Lycoming O-320-A1A engine. The airplane was issued an FAA airworthiness certificate on November 4, 2013. The airplane maintenance records were not located during the investigation, and the airplane's maintenance history could not be determined.

METEOROLOGICAL INFORMATION

At 0853, the automated weather observation for BXK, located about 18 miles northeast of the accident site, reported wind from 140° at 10 knots, visibility 10 statute miles with no clouds, temperature 33°C, dew point 4°C, and an altimeter setting of 29.85 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted rocky, desert terrain and was destroyed by impact forces. The wreckage was dispersed in a triangular pattern over an area that contained two north/south oriented gullies and exhibited impact damage consistent with an inverted, left-wing-down, nose-down attitude at the time of impact. The debris field was 264 ft long and 270 ft wide. The wreckage debris path was oriented on a magnetic heading about 77° from the first identified point of contact (FIPC) to the main wreckage. The FIPC was an area of disturbed ground about 10 inches wide and about 10 ft long that contained red lens fragments. At the end of the area of disturbed ground was the impact crater, measuring about 4 ft in diameter, containing the propeller assembly and engine. One of the propeller blades exhibited heavy gouging on the leading edge and chordwise scoring. The other blade displayed forward bending at the midsection, leading edge scoring and missing material at the tip. The main wreckage was found 146 ft from the FIPC and in the bottom of a 10-ft-deep gully. The main wreckage comprised the horizontal stabilizers and both elevators, cabin area structure, and both wings. The horizontal stabilizer and associated structure remained attached to the main wreckage by the rudder flight control cables and electrical wires. Flight control continuity was attained to the forward cabin area through control cables and impact-damaged ~~control rods~~ push-pull tubes. The left aileron remained attached to the wing by its inboard attachment point. The right aileron separated from the wing and was found near the main wreckage. Both flaps remained attached to the wing and were in a position consistent with the retracted position at the time of impact. The right flap separated at its outboard attachment point and was bent upwards at its midsection. The leading edges of both wings separated, revealing the aft side surfaces of the fuel tanks. The leading edges of both wings displayed crush damage from the tip to the root. Both wing tips separated, and the attachment structure had impact damage. The right wing outboard section was bent downward. The forward side of the cabin floor area exhibited crush damage. The plexiglass canopy, vertical stabilizer, and rudder were not located during the examination of the accident site on that day; they were located several days later about 1 mile northwest of the main wreckage.

During the examination of the recovered wreckage, specimens of biological matter were observed on the underside of the right horizontal stabilizer ~~and upper rear bulkhead behind the pilot's seat position~~. Bird feathers were found in the cockpit under the passenger seat. ~~Bone matter was found between the engine cylinders and on the oil cooler~~. The specimens were collected and sent for further identification and classification. Several components from the empennage, including the vertical stabilizer and horizontal stabilizer assemblies, were shipped to the NTSB materials lab for further examination. Examination of the airframe, engine, and system components revealed no evidence of preimpact mechanical malfunction that would have precluded normal operation.

The complete accident site, engine, and airframe examination reports are appended to this accident in the public docket.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the Medical Examiner at Maricopa County, Phoenix, Arizona, completed an autopsy on the pilot and the passenger and concluded that the causes of death were multiple blunt force trauma and thermal injuries.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens from the pilot. The specimen used to test for volatiles tested positive for ethanol in muscle and lung, N-butanol and propanol in muscle. The test did not detect a presence of drugs in lung. Tests for carbon monoxide and cyanide were not performed.

The Federal Aviation Administration's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens from the passenger. The specimen used to test for volatiles tested positive for ethanol and propanol in muscle. The test did not detect a presence of drugs in muscle. Tests for carbon monoxide and cyanide were not performed.

TEST AND RESEARCH

The Feather Identification Lab, Smithsonian Institution, Washington, DC, determined that biological matter in specimens sent to the lab contained five whole feathers and some downy feather material. All the whole feathers matched a single museum specimen of rock pigeon. Additionally, microscopic examination of the feather samples was consistent with rock pigeon.

On March 23, 2018, airframe components from the empennage were examined at the NTSB Materials Lab, in Washington, DC, and additional samples of biological matter were collected. These samples were extracted from a dented section underneath the horizontal stabilizer to the right of the tailcone, including a small whole feather that was found deep inside the bottom right side of the empennage. This feather and the additional empennage samples were also identified as rock pigeon based on whole feather comparisons and microscopic analysis. Additionally, the impact dent was consistent with the typical size of this bird species.

Components from the empennage, the vertical stabilizer and horizontal stabilizer assemblies were examined to determine the nature of fractured surfaces. All the fracture surfaces were consistent with overstress, and there were no indications of any preexisting damage such as cracks or corrosion. All the examined fracture surfaces of the spars, skins, stabilizers, and other components from the horizontal stabilizer, vertical stabilizer, and rudder assemblies exhibited features consistent with secondary fractures (such as ground impact). There were no clear indications that any of the components that fractured in overstress did so before ground impact or independently of the bird strike.

The complete Smithsonian Feather Lab report and NTSB Materials Lab report are appended to this accident in the public docket.