# Aviation Investigation Final Report

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| **Location:** | Ulysses, Kansas | **Accident Number:** | CEN18FA108 |
| **Date & Time:** | February 22, 2018, 21:08 Local | **Registration:** | N678DD |
| **Aircraft:** | Beech 58 | **Aircraft Damage:** | Destroyed |
| **Defining Event:** | Loss of control in flight | **Injuries:** | 2 Fatal |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

The instrument-rated private pilot and one passenger departed on a personal flight in the pilot's multi-engine airplane in night visual meteorological conditions. A witness saw the lights of the accident airplane about 2 minutes after it departed. Within several seconds, the lights "fell quickly like a shooting star," followed by an orange flash of fire as the airplane impacted terrain. There was no radar or radio communications information associated with the airplane.

The wreckage was severely fragmented, and the evidence at the accident site was consistent with a high-energy impact in a left-wing-low, nose-down attitude. Examination revealed no evidence of any pre-impact mechanical deficiencies with the airplane or engines. Autopsy and toxicology testing of the pilot revealed no evidence of physiological impairment or incapacitation.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
An inflight loss of control and collision with terrain for reasons that could not be determined.

### Findings

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| **Not determined** | (general) - Unknown/Not determined |

# Factual Information

## History of Flight

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| **Enroute-climb to cruise** | Loss of control in flight (Defining event) |

On February 22, 2018, at 2108 central standard time, a Beech 58 airplane, N678DD, was destroyed when it impacted terrain shortly after departure from Ulysses Airport (ULS), Ulysses, Kansas. The private pilot and the passenger were fatally injured. The airplane was privately owned and was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Night visual meteorological conditions prevailed in the area, and no flight plan was filed for the flight, which was destined for Scott City Municipal Airport (TQK), Scott City, Kansas.

According to the pilot's family, the pilot and passenger departed TQK earlier that day destined for ULS. Airport security cameras at ULS indicated that the accident airplane arrived around 1759. The airplane subsequently departed the ramp at 2058. The airplane could be seen airborne over the runway departing toward the south at 2106. TQK was located about 57 nautical miles north-northeast of ULS.

A witness stated that she was driving north on highway 25, just passed Shorter's on the west, about 2107. She saw two red lights and what appeared to be a blue light in the sky. The lights appeared to be west of the highway, slightly above the electrical lines by 25-30 feet. Shortly after first seeing the lights, they "fell quickly like a shooting star," and then she saw an orange flash of fire. She reached for her cell phone and dialed 911, it was 2108 on her phone's call log.

The airplane impacted a harvested alfalfa field about 5 miles north of ULS. There was no radar information associated with the airplane, and the pilot was not in contact with air traffic control at the time of the accident.

## Pilot Information

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| **Certificate:** | Private | **Age:** | 68,Male |
| **Airplane Rating(s):** | Single-engine land; Multi-engine land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | |
| **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:** | October 16, 2017 |
| **Occupational Pilot:** | No | **Last Flight Review or Equivalent:** | February 7, 2017 |
| **Flight Time:** | 3589 hours (Total, all aircraft) | | |

## Passenger Information

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| **Certificate:** | | **Age:** | |
| **Airplane Rating(s):** | | **Seat Occupied:** | Unknown |
| **Other Aircraft Rating(s):** | | **Restraint Used:** | |
| **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:** | | | |

The pilot held a Federal Aviation Administration (FAA) private pilot certificate with airplane single-and multi-engine land and instrument airplane ratings. The pilot's most recent third-class FAA medical certificate was issued on October 16, 2017, with a limitation for corrective lenses.On the application for that medical certificate, the pilot reported 3,589 total hours of flight experience and 42 hours in the previous six months. The pilot's logbook was not recovered.

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Beech | **Registration:** | N678DD |
| **Model/Series:** | 58 UNDESIGNAT | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | 1970 | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | TH-70 |
| **Landing Gear Type:** | | **Seats:** | |
| **Date/Type of Last Inspection:** | May 17, 2017 100 hour | **Certified Max Gross Wt.:** | |
| **Time Since Last Inspection:** | | **Engines:** | Reciprocating |
| **Airframe Total Time:** | 6369.2 Hrs as of last inspection | **Engine Manufacturer:** | Continental Motors Inc |
| **ELT:** | Installed | **Engine Model/Series:** | IO-550-C |
| **Registered Owner:** | On file | **Rated Power:** | 300 Horsepower |
| **Operator:** | On file | **Operating Certificate(s) Held:** | None |

The airplane's airworthiness certificate was issued on June 23, 1970. The low-wing, retractable tricycle landing gear, twin-engine airplane was powered by two Continental IO-550-C, 300-horsepower engines, each driving a McCauley propeller three-bladed, constant-speed, full-feathering propeller.

Maintenance records indicated that the most recent 100-hour inspection was completed on May 17, 2017, at a recorded tachometer time of 6,369.2 hours (recording hour meter 5,619.2 hours), a recorded right engine total time of 1,680.2 hours, left engine total time of 3,235.6 hours, and 711.2 hours since both engines received their last major overhaul. The last maintenance entry was dated January 13, 2018, at a recording hour meter time of 5,681 hours. The entry indicated that a new dry air pump and oil filter was installed. The tachometer and recording hour meter were not located at the accident site, and the airframe and engine times at the time of the accident could not be determined.

A fuel receipt found at the accident site indicated that the airplane was refueled on February 7, 2018, at TQK with 65.4 gallons of 100LL aviation fuel. Fuel facility inspection records from TQK indicated the last 100LL fuel tank sump check completed prior to the aircraft accident was January 19, 2018; and after the accident on February 27, 2018. These records indicated no contaminates were found in the 100 LL fuel facility system during either of the sump checks.

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Night |
| **Observation Facility, Elevation:** | KJHN,3325 ft msl | **Distance from Accident Site:** | 0 Nautical Miles |
| **Observation Time:** | 21:08 Local | **Direction from Accident Site:** | 0° |
| **Lowest Cloud Condition:** | Clear | **Visibility** | 10 miles |
| **Lowest Ceiling:** | None | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 12 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 150° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.01 inches Hg | **Temperature/Dew Point:** | -3°C / -4°C |
| **Precipitation and Obscuration:** | No Obscuration; No Precipitation | | |
| **Departure Point:** | Ulysses, KS (ULS ) | **Type of Flight Plan Filed:** | None |
| **Destination:** | Scott City, KS (TQK ) | **Type of Clearance:** | None |
| **Departure Time:** | 21:06 Local | **Type of Airspace:** | |

The 2108 recorded observation at ULS included wind from 150º at 12 knots, 10 statute miles visibility, temperature -3ºC, dew point -4ºC, and altimeter 30.01 inches of mercury.

The moonrise and moonset calculator indicated that, at 2106, the position of the moon in Hutchinson, Kansas, was at an altitude of 47º and a heading of 249º. The moon illumination at the time of the meridian passing, about 1816 was 46.4%. Hutchinson, Kansas in located about 190 miles east of Ulysses, Kansas, and is the closes location of moonrise and moonset observation.

## Airport Information

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| **Airport:** | Ulysses ULS | **Runway Surface Type:** | |
| **Airport Elevation:** | 3070 ft msl | **Runway Surface Condition:** | Unknown |
| **Runway Used:** | | **IFR Approach:** | None |
| **Runway Length/Width:** | | **VFR Approach/Landing:** | None |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 Fatal | **Aircraft Damage:** | Destroyed |
| **Passenger Injuries:** | 1 Fatal | **Aircraft Fire:** | On-ground |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | Unknown |
| **Total Injuries:** | 2 Fatal | **Latitude, Longitude:** | 37.652778,-101.370552 |

The airplane impacted the ground in a left-wing-low, nose-down attitude and was severely fragmented. A postimpact fire consumed several portions of the airframe. The main wreckage came to rest on a heading of 230° at an elevation of 3,060 ft mean sea level; the engines were separated from the airframe. The wreckage path was about 570 ft long and was oriented on a heading of about 235°.

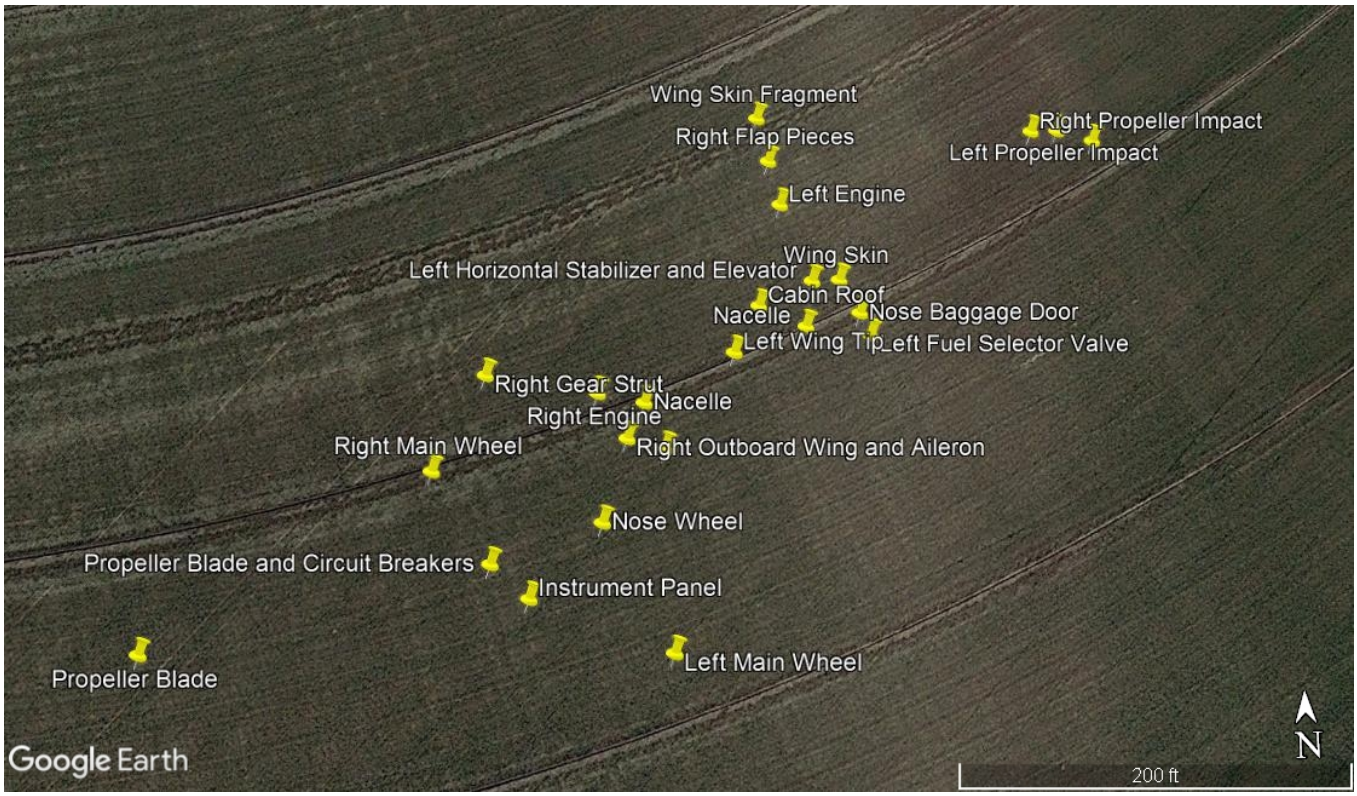


Figure 1: Wreckage Diagram

All flight control surfaces and major components of the airplane were present at the site; however, flight control continuity could not be confirmed due to the extent of impact damage. The elevator, elevator trim, rudder, and rudder trim cables remained attached to their respective flight control surfaces. The cables were traced continuously from the tail section to the forward section of the floorboard. The left and right elevator trim actuators were found in a 15º tab down (nose-up) position. The rudder trim was found at a 0º (neutral) position.

The right wing flap actuator remained mounted on the flap and measured 2 inches, which correlated to a flap setting between 0º and 5º. The left flap actuator was not attached to the left wing flap; however, it remained attached to the actuator cable. The actuator measurement corresponded to a flap setting of 0º. The outboard fuel caps in the right and left wings remained installed.

The right main landing gear remained attached to the gear strut. Based on the position of the landing gear actuator, the gear was in the retracted position at the time of impact.

Compressed air was blown into both fuel selector valves to determine selector position. Both fuel selectors were found in the ON position. One fuel strainer screen was observed in the wreckage field; it was free of debris.

The autopilot cockpit control panel was tested by turning the selector shaft into each position. The selector was in the center position, which correlated to "heading."

Numerous instruments were found in the wreckage path; however, the instruments suffered impact damage and did not provide usable information.

The left and right propeller hubs were fractured into multiple pieces and all blades were separated. All six blades exhibited varying degrees of S-bending, polishing, chordwise scratching, and/or leading-edge gouging, consistent with the engines producing power at the time of impact.

The right engine separated from the engine nacelle and came to rest inverted about 300 ft north of the initial ground scar. Several components separated from the engine, including the engine oil sump and pick-up tube, engine exhaust components, induction components, fuel pump, fuel control unit, vacuum pump, spin-on type oil filter, engine starter motor, left and right magnetos, and engine driven front-mounted alternator. The forward section of the crankcase was impact damaged with crankcase material missing exposing internal components. All six cylinders remained attached to their respective mounts, with cylinder Nos. 4, 5, and 6 exhibiting impact damage. The ignition harness was impact damaged.

The left engine separated from the engine nacelle and was located upright about 150 ft south of the initial ground scar. Several components separated from the engine, including the exhaust components, induction components, left and right magnetos, fuel manifold, engine-driven fuel pump, fuel control unit, vacuum pump, spin-on type oil filter, engine starter motor, and engine-driven front-mounted alternator. All six cylinders remained attached to their respective mounts, with cylinder No. 6 exhibiting impact damage. The starter adapter remained attached but was impact damaged.

The airplane was recovered from the site and transported to a recovery facility for further examination. No pre-impact damage was noted to the right and left engine-driven fuel pumps, the right and left engine fuel manifold, right and left engine oil pumps and pressure relief valves, and the right and left vacuum pumps. The oil filters for both engines were opened, and the paper filter media appeared clean. The left engine magnetos were manually rotated and produced spark at the ignition leads. The right magneto for the right engine was manually rotated and produced a spark at the ignition leads. The left magneto for the right engine did not produce spark when manually rotated. The magneto was disassembled; the points were observed closed and did not open when the magneto was rotated. The points were adjusted, and the magneto produced a spark at the ignition leads when rotated. The fuel injectors for the left engine were open with no contamination noted. The fuel injectors for cylinder Nos. 1 and 2 were separated; the remaining fuel injectors were clear of contamination. When compared to a Champion Sparkplug "Check-a-Plug" chart, all sparkplugs appeared to be "normal" in wear and coloration except the sparkplug from cylinder No. 6 on the right engine, which was impact damaged.

Continuity of the left engine was confirmed by suction and compression in each cylinder except for cylinder No. 6, which was heavily impact damaged. The right engine could not be rotated due to impact damage. A lighted electronic borescope examination was performed; all piston domes and intake and exhaust valves remained intact and exhibited normal combustion signatures; cylinder No. 6 was impact damaged and the valves were released. The crankcase was opened, and all internal components exhibited no anomalies.

Examination of the airframe and engines did not reveal evidence of any mechanical anomalies that would have precluded normal operation.

## Medical and Pathological Information

The Grant County Coroner, Liberal, Kansas, performed an autopsy of the pilot. The cause of death was blunt injuries, and the manner of death was airplane crash. In addition, the pathologist noted mild atherosclerosis of the aorta. No other significant natural disease was identified.

The FAA Forensic Sciences Laboratory performed toxicology testing on samples taken from the pilot during the autopsy. Testing detected a small amount of ethanol in heart but not muscle, consistent with post-mortem production. No medications or illicit drugs that could pose hazards to flight safety were detected.

## Administrative Information

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| **Investigator In Charge (IIC):** | Liedler, Courtney |
| **Additional Participating Persons:** | Richard Terrell; FAA; Wichita, KS<br>Michael H Council; Continental Motors Inc; Mobile, AL<br>Peter J Basile; Textron Aviation; Wichita, KS |
| **Original Publish Date:** | April 13, 2020 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | The NTSB traveled to the scene of this accident. |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=96778 |