# Aviation Investigation Final Report

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| **Location:** | Cleburne, Texas | **Accident Number:** | CEN21FA290 |
| **Date & Time:** | June 24, 2021, 17:14 Local | **Registration:** | N9261L |
| **Aircraft:** | American Aviation AA-1A | **Aircraft Damage:** | Destroyed |
| **Defining Event:** | Loss of control in flight | **Injuries:** | 2 Fatal |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

The pilot and passenger were conducting a local sightseeing flight. A video uploaded to the passenger's social media, recorded about 6 minutes after takeoff, showed the pilot with his left hand on the control yoke, a tablet connected to the yoke, and a cell phone in his right hand. The airplane's canopy was open about 8 to 10 inches. Flight track data showed that, about 10 minutes later, while in cruise flight at an altitude about 2,600 ft mean sea level, the airplane entered a hard right turn immediately followed by a left spiraling descent toward the ground. A witness observed the airplane in a vertical descent but did not see the impact.

The airplane impacted a rural field with minimal forward momentum. The sliding canopy was found separated from the fuselage on the front right side of the wreckage. The canopy screw knob lock was found mostly unscrewed or loosened. Damage to the canopy and witness marks on the rear fuselage were consistent with the canopy position fully open during impact. According to the pilot's family, he would typically fly with the canopy partially open when increased airflow was necessary to cool the cockpit. A placard in the airplane indicated that the canopy could be opened to halfway in flight and that flight was not allowed with the canopy fully open.

The airplane's engine monitor data were consistent with normal engine operation before the turning descent; however, during the descent, the manifold pressure was low, which is consistent with a closed throttle plate. The data are consistent with a commanded throttle reduction and not a loss of engine power, which would have indicated a value closer to outside barometric pressure.

The canopy moving to a fully open position in flight would have significantly increased drag and presented a major distraction for the pilot. During the turning descent, it is likely that the pilot pulled the throttle to idle in attempt to slow the airplane and regain control. The airplane

ultimately entered an aerodynamic stall and subsequent spin from which the pilot was unable to recover with the altitude available.

## Probable Cause and Findings

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

The canopy moving fully open during flight, which resulted in the pilot's distraction and a subsequent aerodynamic stall/spin and loss of control.

### Findings

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| **Aircraft** | (general) - Unintentional use/operation |
| **Aircraft** | (general) - Not attained/maintained |

# Factual Information

## History of Flight

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| **Enroute** | Loss of control in flight (Defining event) |
| **Enroute** | Aerodynamic stall/spin |
| **Enroute** | Inflight upset |

On June 24, 2021, at 1714 central daylight time, an American Aviation AA-1A airplane, N9261L, was destroyed when it was involved in an accident near Cleburne, Texas. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

Flight track data showed that the airplane departed Cleburne Regional Airport (CPT), Cleburne, Texas, about 1658 and flew south then northeast toward Keene, Texas. After the airplane made a tight left 360° turn over Keene, it proceeded west and overflew CPT. The airplane continued west at an altitude about 2,600 ft msl for another 3 miles. During the last 10 seconds of the recorded data, the flight track showed a hard right turn, immediately followed by a left spiraling descent toward the ground (see figure). There were no recorded air traffic control communications during the flight.

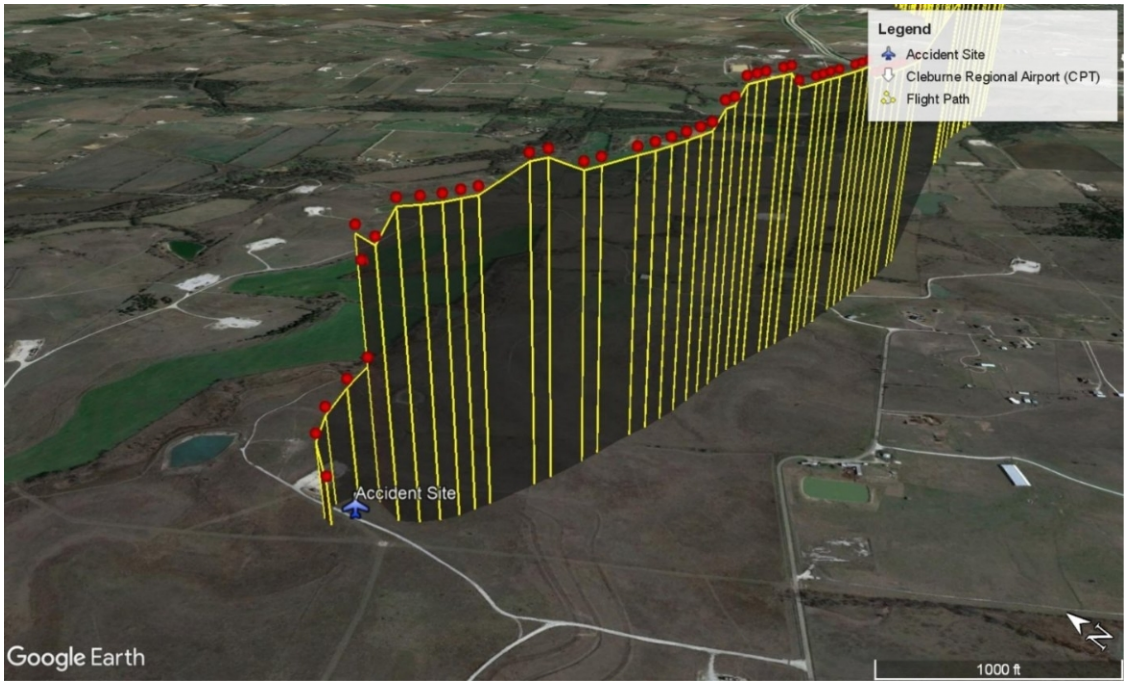

Figure 1. End of flight track and accident location

A witness, who was located about 1/2 mile south of the accident site, stated that he observed the airplane "going straight down," but he did not see it impact the ground.

An in-flight video from the passenger's cell phone was uploaded to his social media account. The video started by showing the airplane's left wing, then panned right to show the front of the cockpit, then showed the pilot in the right seat. The pilot had his left hand on the control yoke, a tablet connected to the yoke, and a cell phone in his right hand. The canopy was open about 8 to 10 inches. Based on the cockpit instruments, the airplane was about 1,960 ft above mean sea level (msl) and climbing about 400 to 500 ft per minute. The airspeed indicator showed about 100 to 105 knots. Based on the geographical landmarks, the video was recorded about 6 minutes after takeoff and 10 minutes before the accident, as the airplane was headed northeast toward Keene.

## Pilot Information

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| **Certificate:** | Private | **Age:** | 20,Male |
| **Airplane Rating(s):** | Single-engine land | **Seat Occupied:** | Right |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | 3-point |
| **Instrument Rating(s):** | None | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | Yes |
| **Medical Certification:** | Class 2 Without waivers/limitations | **Last FAA Medical Exam:** | March 18, 2020 |
| **Occupational Pilot:** | No | **Last Flight Review or Equivalent:** | June 1, 2020 |
| **Flight Time:** | (Estimated) 197.7 hours (Total, all aircraft), 140.1 hours (Total, this make and model), 133.8 hours (Pilot In Command, all aircraft), 36 hours (Last 90 days, all aircraft), 12.2 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft) | | |

## Passenger Information

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| **Certificate:** | | **Age:** | 20,Male |
| **Airplane Rating(s):** | | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | | **Restraint Used:** | None |
| **Instrument Rating(s):** | | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | | **Toxicology Performed:** | |
| **Medical Certification:** | | **Last FAA Medical Exam:** | |
| **Occupational Pilot:** | No | **Last Flight Review or Equivalent:** | |
| **Flight Time:** | | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | American Aviation | **Registration:** | N9261L |
| **Model/Series:** | AA-1A | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | 1971 | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal; Utility | **Serial Number:** | AA1A-0161 |
| **Landing Gear Type:** | Tricycle | **Seats:** | 2 |
| **Date/Type of Last Inspection:** | June 15, 2021 Annual | **Certified Max Gross Wt.:** | 1500 lbs |
| **Time Since Last Inspection:** | 11.6 Hrs | **Engines:** | 1 Reciprocating |
| **Airframe Total Time:** | | **Engine Manufacturer:** | LYCOMING |
| **ELT:** | C91A installed, activated, did not aid in locating accident | **Engine Model/Series:** | O-320-D3G |
| **Registered Owner:** | | **Rated Power:** | 150 Horsepower |
| **Operator:** | On file | **Operating Certificate(s) Held:** | None |

The accident airplane was equipped with a plexiglass and aluminum sliding canopy, which has inner tracks that slide on outer tracks with Teflon runners. The tracks allow the canopy to be slid forward and aft and provide access to the cabin. The left-side outer track features a placard that indicates the ½ open canopy point and states "130 MPH MAX WITH CANOPY ½ OPEN. NO FLIGHT WITH CANOPY FULL OPEN."

A Grumman Pilot's Association representative stated that the airplane would still fly with the canopy fully open, but there would be a significant increase in drag.

After the accident, the pilot's father stated that the pilot flew with the canopy open when warm temperatures required additional airflow into the cockpit. If it was cold outside, then he did not open the canopy. The canopy was frequently opened while on the ground to get more airflow. The pilot would always manipulate the canopy by himself and did not request assistance from the passenger. The cockpit was small enough that the pilot could reach over and easily move the canopy by himself. The pilot liked to do this himself to make sure equal pressure was applied to both sides and the canopy would move smoothly. If there was unequal pressure applied, then the canopy could jam on one side. The pilot was reportedly always in control of manipulating the canopy and never appeared to have any issues with it moving backward in-flight. The pilot's father had noticed that the canopy would sometimes move forward during flight, and the pilot would have to adjust it aft as necessary. He would adjust the black screw knob lock to help keep the canopy in place.

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | KCPT,854 ft msl | **Distance from Accident Site:** | 3 Nautical Miles |
| **Observation Time:** | 17:35 Local | **Direction from Accident Site:** | 88° |
| **Lowest Cloud Condition:** | Clear | **Visibility** | 10 miles |
| **Lowest Ceiling:** | None | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 16 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 170° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 29.9 inches Hg | **Temperature/Dew Point:** | 35°C / 21°C |
| **Precipitation and Obscuration:** | No Obscuration; No Precipitation | | |
| **Departure Point:** | Cleburne, TX (CPT) | **Type of Flight Plan Filed:** | None |
| **Destination:** | Cleburne, TX | **Type of Clearance:** | None |
| **Departure Time:** | 16:58 Local | **Type of Airspace:** | Class G |

## Airport Information

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| **Airport:** | CLEBURNE RGNL CPT | **Runway Surface Type:** | |
| **Airport Elevation:** | 854 ft msl | **Runway Surface Condition:** | |
| **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:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 2 Fatal | **Latitude, Longitude:** | 32.352429,-97.493799(est) |

The airplane came to rest in a rural field and partially on a gravel road. The initial impact point was identified by an impression in the dirt, which contained red glass near the outboard tip consistent with the left wing. The empennage was distorted to the left and the accident site showed signs of minimal forward momentum. All major components of the airplane were found at the accident site with the main wreckage.

The sliding canopy frame had separated from the fuselage and was found on the forward right side, in front of the right wing; the plexiglass had shattered and was dispersed around the accident site. The left side of the canopy frame was bent inboard about 30 inches from the aft end. The left side canopy track was separated from the fuselage. It contained a screw knob lock, which was mostly unscrewed, or loosened. The lock was screwed through its full range with no anomalies noted.

The left rear fuselage, under the left rear window, contained impact witness marks and damage similar to the shape of the lower canopy frame and inner tracks. An exemplar AA-1A airplane was examined to compare to the accident airplane canopy damage and witness marks. When the canopy was positioned full aft, the frame and inner tracks aligned with the rear fuselage underneath the rear window and above the accent paint line. When the canopy was slightly opened, the inner tracks did not extend back to the rear fuselage. The were no other preimpact anomalies with the airplane that would have precluded normal operation.

The engine remained partially attached to the airframe and sustained significant impact damage. The propeller remained attached to the crankshaft flange via two bolts. The propeller blades exhibited damage and scoring on the blade faces. One blade was bent aft about mid span with no leading edge damage. The other blade was mostly straight and exhibited leading edge gouges and chordwise scratches near the tip. Examination of the engine did not reveal any preimpact mechanical malfunctions or failures that would have precluded normal operation.

The airplane was equipped with a JPI engine monitor, and data from the accident flight was extracted. During the accident flight between 1659 and 1709, the data appeared normal with no abnormalities. At 1709:40, the exhaust gas temperatures (EGT), cylinder head temperatures (CHT), oil pressure, engine rpm, manifold pressure, fuel flow, and horsepower all decreased slightly for about 40 seconds. The shock cool rate increased from 0°/min to 25°/min, then back to 0°/min after 48 seconds. This timeline corresponded to the flight track data where the airplane made a tight left 360° turn over Keene, Texas. At 1710:50, all parameters appeared to level off and were normal, albeit slightly lower than before the previous maneuver. At 1713:30, the data showed a significant reduction in engine power evidenced by a simultaneous rapid decrease in EGT, CHT, oil pressure, rpm, manifold pressure fuel flow, and horsepower. The shock cooling rate again rapidly increased from 0°/min to 42°/min. This timeline corresponded to the end of the flight track data where the airplane descended in a left spiral toward the ground.

Of interest was the manifold pressure data after 1713:30, which depicted a much lower barometric pressure, which was consistent with a closed throttle plate. Additionally, the fuel pressure value throughout the flight remained nominal. The engine data before 1713:30 was nominal.

## Administrative Information

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| **Investigator In Charge (IIC):** | Lindberg, Joshua | | |
| **Additional Participating Persons:** | Darren Pittacora; Federal Aviation Administration; Arlington, TX<br>Mark Platt; Lycoming Engines; Williamsport, PA | | |
| **Original Publish Date:** | August 12, 2022 | **Investigation Class:** | 3 |
| **Note:** | | | |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=103344 | | |