Aviation Investigation Final Report

Location:	Harrison, Michigan	**Accident Number:**	CEN22FA029
Date & Time:	November 5, 2021, 09:37 Local	**Registration:**	N16TG
Aircraft:	Vans RV	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Flight track data indicated that the airplane was on a cross-country flight in level cruise flight until track data were lost. The airplane impacted the back yard of a residence. Impact signatures indicated a 45° nose-low impact angle, consistent with an aerodynamic stall. The airplane's wood core propeller was not splintered, indicating low or no engine power at impact. Examination of the airframe, engine, and related systems did not reveal any preimpact mechanical malfunctions or failures that would have precluded normal operations.

The accident site was located about 7.3 nautical miles (nm) to the east of the last recorded track and about 1 nm south of the approach end of an airport runway. The location of the accident site suggests that the pilot had diverted from his original course and was attempting to land at the nearby airport. The loss of automatic dependent surveillance-broadcast (ADS-B) flight track data and discrete radar beacon returns indicated an interruption of transmission of the data from the airplane.

Based on the available information, it is likely that the pilot was diverting to the airport near the accident site. The pilot had been in communication with air traffic control, but no distress calls were received. This along with the interruption of ADS-B track data and discrete radar beacon returns suggest a possible interruption in airplane electrical power. However, loss of electrical power would not explain the lack of engine power at impact since one of the ignition systems could operate independently without aircraft electrical power.

Additionally, the distance from the final radar return to the accident site was not consistent with the achievable glide ratio of the airplane, suggesting that the engine did not lose power at the point where the final discrete beacon return was received. Therefore, the reason the airplane was diverting to the alternate airport could not be determined. The impact signatures indicated that the pilot likely failed to maintain the proper airspeed, leading to an exceedance

of the airplane's critical angle of attack and subsequent aerodynamic stall and loss of airplane control.

Based upon the results from the toxicology, the pilot likely had taken allergy, cold, or sleep-aid medications. However, pilot performance does not appear to be an issue. Thus, while diphenhydramine was detected during the toxicology, it is unlikely that the effects from the pilot's use of diphenhydramine contributed to this accident.

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 adequate airspeed and exceedance of the airplane's critical angle of attack during landing approach, which resulted in an aerodynamic stall.

Findings

Aircraft	Angle of attack - Capability exceeded
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Enroute-cruise	Loss of engine power (total)
Enroute-cruise	Loss of control in flight (Defining event)
Approach-VFR pattern final	Aerodynamic stall/spin

On November 5, 2021, about 0937 eastern daylight time, an amateur-built Van's RV-6 airplane, N16TG, was destroyed when it was involved in an accident near Harrison, Michigan. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

ADS-B data indicated that the airplane departed runway 27L at Oakland International Airport (PTK), Pontiac, Michigan at 0846. After departure the airplane made a climbing right turn and flew northwest for about 12 nm, then turned north for about 5 nm, then back to a northwest heading. The airplane reached a cruise altitude of about 3,000 ft mean sea level and remained on the northwest heading until track data was lost about 0905. The last ADS-B position was about 56 nm and 143° from the accident site. Discrete radar beacon returns showed that the airplane continued a straight-line course for another 60 nm after the loss of ADS-B data. The radar data showed that the airplane was in straight and level flight before the end of the data. The accident site was located about 1 nm south of the approach end of runway 36 at the Clare County Airport (80D), Harrison, Michigan.

The pilot was in communication with air traffic control facilities during the flight, having requested and received flight-following after his departure from PTK. Air traffic control did not receive any distress calls from the pilot.

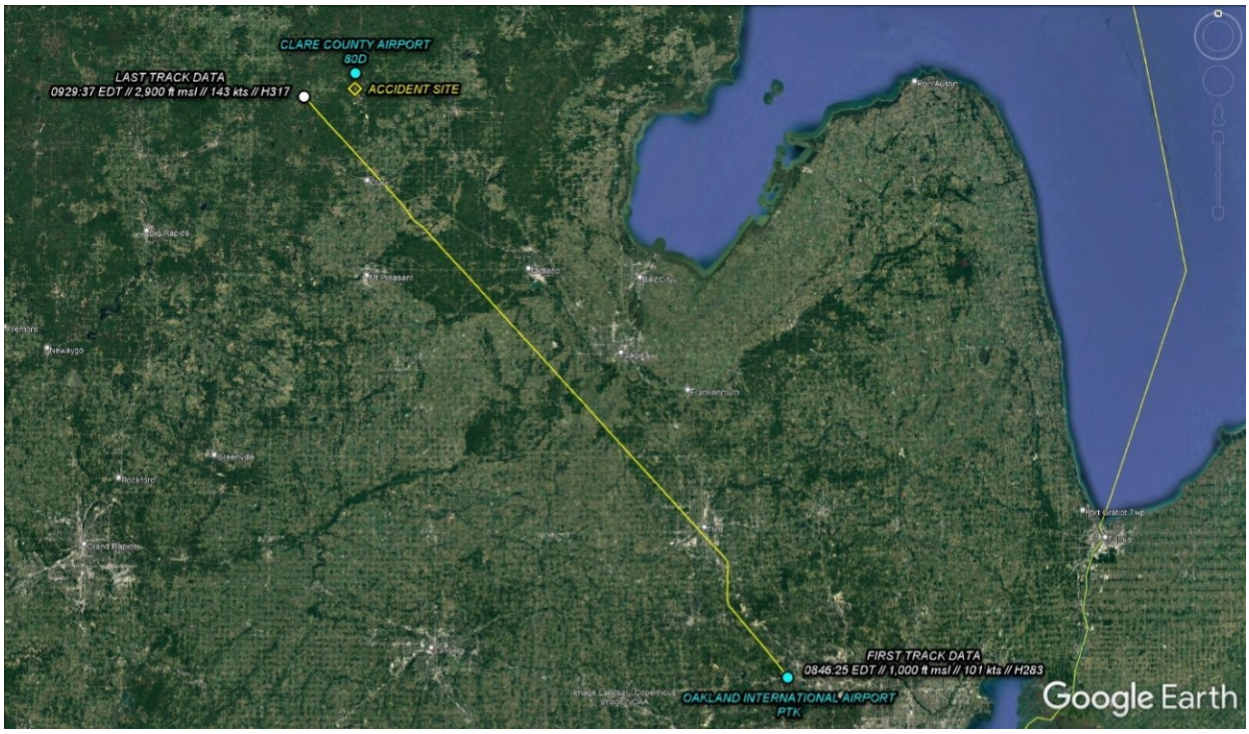

Figure 1. Plot of ADS-B track data for the entire flight.

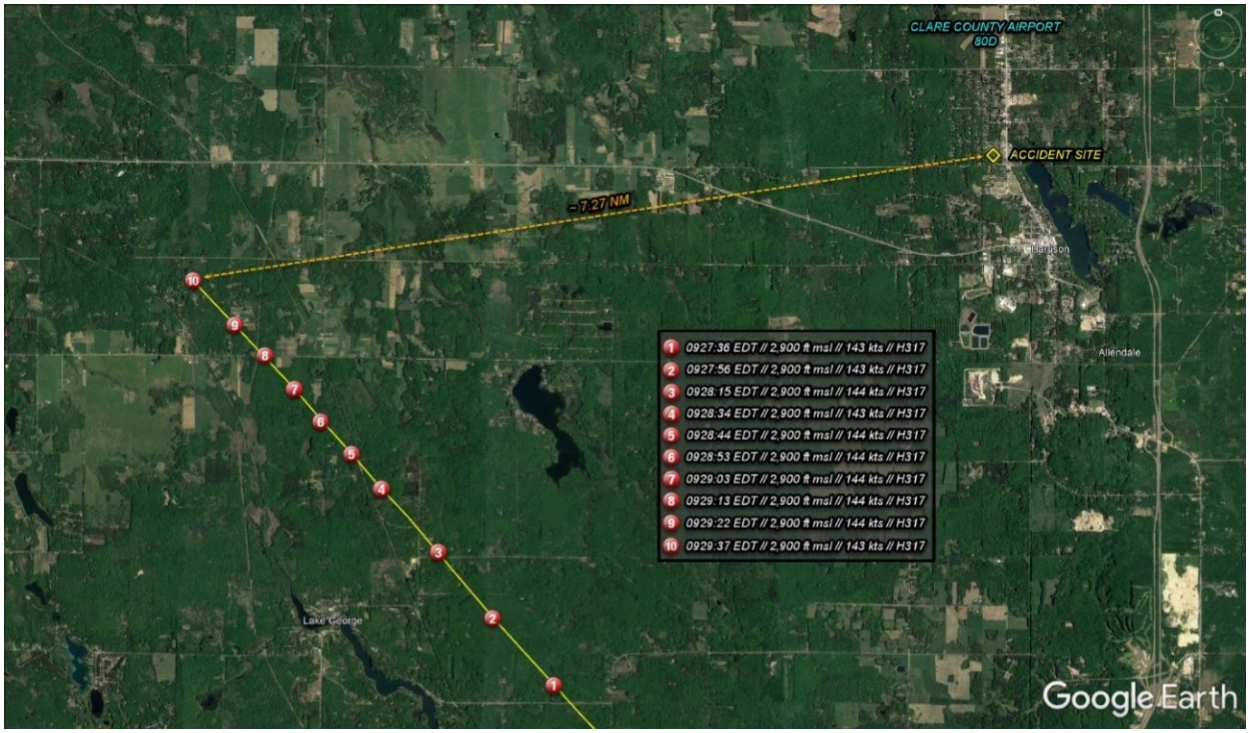

Figure 2. Plot of the final portion of the accident flight.

The airplane impacted the back yard of a residence. Impact signatures indicated that the airplane struck the ground about 45º nose low. The initial impact point was located directly

beneath the airplane. The airplane remained predominately intact with all major airframe components still connected. The engine was partially attached to the fuselage. The three-blade wood core propeller was attached to the engine. One blade was broken off near the blade root. None of the propeller blades were splintered and they were predominately intact, consistent with low or no engine power at impact.

Figure 3. Airplane at accident scene.

The engine's crankshaft could be rotated using the propeller. Compression and suction were verified on all cylinders during engine rotation. Accessory gear and camshaft continuity was verified. The engine's carburetor was partially disassembled, and no anomalies were noted.

The engine was equipped with dual electronic ignition systems. One ignition system was damaged due to impact forces and could not be tested. This system relied on airplane electrical power for all operation. The second ignition system utilized airplane electrical power for starting and low (idle) power running and had an internal alternator to support ignition at higher engine rpm. The unit was designed to automatically switch from airplane electrical power to the internal alternator as necessary during operation and could maintain engine

ignition if airplane electrical power was interrupted. Functional testing of the ignition was performed and no preimpact anomalies were detected.

The airplane was equipped with a GRT Avionics MX100-01, and a Horizon EFIS HX MFD-03-070801. Both units were removed from the airplane for possible download of data. Subsequent research revealed that neither unit was cable of storing data internally.

Examination of the airframe and engine did not reveal any preimpact anomalies that would have precluded normal operations.

No manufacturer published glide ratio data were found for the accident model airplane; however, builder data from online sources indicated that a glide ratio of about 7:1 was achievable. The distance and altitude from the last radar return to the accident site would have required a glide ratio of about 23:1.

According to the Western Michigan University, School of Medicine, Medical Examiner and Forensic Science autopsy report prepared for the Clare County Medical Examiner, the cause of the pilot's death was multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified. Federal Aviation Administration Forensic Sciences Laboratory toxicology testing detected the sedating antihistamine diphenhydramine in the pilot's cavity blood at 18 nanograms per milliliter (ng/mL) and in his liver tissue. The non-impairing antihistamine loratadine, commonly marketed as Claritin, and its metabolite desloratadine were also detected in the pilot's cavity blood and liver tissue.

Pilot Information

Certificate:	Commercial; Private	**Age:**	67,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Balloon	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	BasicMed Without waivers/limitations	**Last FAA Medical Exam:**	May 10, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	3200 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Vans	**Registration:**	N16TG
Model/Series:	RV 6	**Aircraft Category:**	Airplane
Year of Manufacture:	2003	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	25730
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	1600 lbs
Time Since Last Inspection:		**Engines:**	1
Airframe Total Time:		**Engine Manufacturer:**	
ELT:	Installed	**Engine Model/Series:**	
Registered Owner:		**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KMOP,755 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:		**Direction from Accident Site:**	173°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 5000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.35 inches Hg	**Temperature/Dew Point:**	2°C / -1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pontiac, MI (PTK)	**Type of Flight Plan Filed:**	None
Destination:	Empire, MI (Y87)	**Type of Clearance:**	None
Departure Time:	08:46 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	CLARE COUNTY 80D	**Runway Surface Type:**	Asphalt
Airport Elevation:	1142 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	2978 ft / 50 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	44.032792,-84.810053

Administrative Information

Investigator In Charge (IIC):	Brannen, John		
Additional Participating Persons:	Michael Matthews; FAA - FSDO; Grand Rapids, MI		
Original Publish Date:	April 19, 2023	**Investigation Class:**	3
Note:			
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=104207		