Aviation Investigation Final Report

Location:	Gustavus, Ohio	**Accident Number:**	CEN18LA014
Date & Time:	October 16, 2017, 21:12 Local	**Registration:**	N105MK
Aircraft:	DIAMOND AIRCRAFT IND INC DA 40	**Aircraft Damage:**	Substantial
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	1 Serious, 1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was maneuvering to land at the destination airport after a cross-country flight in dark night, visual meteorological conditions. The pilot reported that he became disoriented as he orbited the airport waiting for the airport manager to turn on the runway lights, which resulted in him believing that he was on final approach to runway 1 instead of runway 19. The pilot stated that, during final approach, he incorrectly identified a crossing road that he believed was about 3/4 mile south of the runway 1 approach threshold; however, the road he observed was about 1 mile north of the airport. The pilot stated that he and his passenger suddenly saw tree branches appear as the airplane descended on final approach. The pilot immediately increased engine power and airplane pitch in an attempt to avoid the trees, but the right wing impacted a tree, and the airplane subsequently impacted terrain about 1/2 mile north of runway 19.

The pilot reported that there were no mechanical failures or malfunctions with the airplane that would have precluded normal operation. The pilot had previously flown 7 hours during nighttime conditions; however, he had not flown at night within the 238 days preceding the accident. According to federal regulations, pilots are prohibited from acting as pilot-in-command with passengers at night unless they have completed three night takeoffs and three night landings within the previous 90 days. An ancillary benefit of pilots maintaining their regulatory night flight currency is that it demonstrates their having an adequate level of proficiency of night flight operations on a recurring basis. The pilot's lack of recent night flight experience likely contributed to his becoming disorientated while maneuvering in the airport traffic pattern, the airplane descending below a normal approach path, and the collision with trees.

Probable Cause and Findings

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

The pilot's geographic disorientation while maneuvering in the airport traffic pattern in dark night conditions, which resulted in the airplane descending below a normal approach path and a collision with trees. Contributing to the accident was the pilot's lack of recent night flight experience.

Findings

Aircraft	Descent/approach/glide path - Not attained/maintained
Personnel issues	Geographic disorient (lost) - Pilot
Personnel issues	Aircraft control - Pilot
Environmental issues	Dark - Effect on personnel
Personnel issues	Recent experience - Pilot
Environmental issues	Tree(s) - Effect on operation

Factual Information

History of Flight

Approach-VFR pattern final	Controlled flight into terr/obj (CFIT) (Defining event)

On October 16, 2017, about 2112 eastern daylight time, a Diamond Aircraft Industries DA40 single-engine airplane, N105MK, collided with trees and terrain while on final approach to Gustavus Airport (OH33), Gustavus, Ohio. The private pilot was seriously injured, his passenger was not injured, and the airplane sustained substantial damage. The airplane was registered to and operated by the pilot under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91 without a flight plan. Night visual meteorological conditions prevailed for the cross-country flight that departed at 1730 central daylight time from Bult Field Airport (C56), Monee, Illinois.

The pilot reported that he had originally planned to land at Northeast Ohio Regional Airport (HZY), Ashtabula, Ohio; however, as the flight approached HZY he was unable to activate the airport's runway lights using the designated common traffic advisory frequency. The pilot subsequently diverted to OH33 and telephoned the airport manager to have the runway lights turned on. The pilot reported that he became disoriented as he orbited the airport waiting for the runway lights to be turned on, which resulted in him believing that he was on final approach to runway 1 instead of runway 19. The pilot stated that during final approach he incorrectly identified a crossing road that he believed was about 3/4 mile south of runway 1 approach threshold; however, the road he observed was about 1 mile north of the airport. The pilot stated that he and his passenger suddenly saw tree branches appear as the airplane descended on final approach. The pilot immediately increased engine power and airplane pitch in attempt to avoid the trees, but the right wing impacted a tree and the airplane subsequently impacted terrain about 1/2 mile north of runway 19. The right wing, aft fuselage, and empennage sustained substantial damage during the impact sequence. The pilot reported that there were no mechanical failures or malfunctions with the airplane that would have precluded normal operation.

At 2051, the Youngstown-Warren Regional Airport automated surface observing system located about 12 miles south of the accident site reported: calm wind, a clear sky, 10 miles surface visibility, temperature 5°C, dew point 0°C, and an altimeter setting of 30.28 inches of mercury.

The United States Naval Observatory data indicated that the sunset and end of civil twilight at the accident site were at 1840 and 1908, respectively. Moon transit, the time at which the moon is highest in the sky, occurred at 1051 and the moonset was at 1726. Additionally, the accident site was located in a sparsely populated area with minimal illumination from ground light sources. As such, dark nighttime conditions likely existed at the time of the accident.

The pilot reported that he had previously flown 7 hours during nighttime conditions; however, he had not flown at night within the 90 days preceding the accident. He reported that his most recent night flight was completed on February 20, 2017, during which he made a night landing on runway 1 at OH33. According to federal regulation 14 CFR Part 61.57(b), pilots are prohibited from acting as pilot-in-command with passengers at night unless they have completed 3 night takeoffs and 3 night landings within the previous 90 days.

Pilot Information

Certificate:	Private	**Age:**	71,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	October 4, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 20, 2017
Flight Time:	778 hours (Total, all aircraft), 402 hours (Total, this make and model), 668 hours (Pilot In Command, all aircraft), 36 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 11 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	DIAMOND AIRCRAFT IND INC	**Registration:**	N105MK
Model/Series:	DA 40	**Aircraft Category:**	Airplane
Year of Manufacture:	2002	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	40.244
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 11, 2017 Annual	**Certified Max Gross Wt.:**	2535 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	768.4 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, not activated	**Engine Model/Series:**	IO-360-M1A
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	YNG,1192 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	20:51 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.28 inches Hg	**Temperature/Dew Point:**	5°C / 0°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Monee, IL (C56)	**Type of Flight Plan Filed:**	None
Destination:	Gustavus, OH (OH33)	**Type of Clearance:**	None
Departure Time:	17:30 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Gustavus Airport OH33	**Runway Surface Type:**	Grass/turf
Airport Elevation:	1096 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	19	**IFR Approach:**	None
Runway Length/Width:	3300 ft / 90 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 None	**Latitude, Longitude:**	41.453609,-80.692779

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Zoltan Vidacs; Federal Aviation Administration, Cleveland FSDO; Cleveland, OH
Original Publish Date:	January 25, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96203