



Aviation Investigation Final Report

Location:	Ephraim, Wisconsin	Accident Number:	CEN16FA373
Date & Time:	September 18, 2016, 20:31 Local	Registration:	N2012F
Aircraft:	Cessna 182	Aircraft Damage:	Destroyed
Defining Event:	Controlled flight into terr/obj (CFIT)	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was flying a passenger, who was a student pilot, home after her completion of a lesson with a flight instructor. During the night arrival to a nontowered airport, the pilot descended to about 150 ft above the ground on an extended right base to the runway. He subsequently flew across the runway's final approach course and began a left turn away from the runway, which continued for about 300° until impact with 50-ft-tall trees.

Although adequate visibility and moon illumination existed for a night visual approach, the runway's final approach was over an unpopulated state park surrounded by water on three sides with little cultural lighting. The lack of visual cues over this dark area likely contributed to the pilot perceiving his altitude to be higher than it was. Additionally, when the pilot turned left toward the dark area, he turned the airplane away from the runway's visual glideslope indicator, which could have provided the pilot with information about his height above the terrain. Further, the low altitude at which the pilot approached the airport and subsequently initiated his maneuvering to align with the runway did not allow for any imprecision in altitude control.

It is unlikely that the pilot's diabetes, high blood pressure, or medications used to treat these conditions impaired the pilot or contributed to the accident. Additionally, there is no evidence the pilot's coronary artery disease or bilateral cataracts impaired the pilot or contributed to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper decision to execute a maneuvering approach at low altitude during night conditions, which resulted in controlled flight into terrain.

Findings

Personnel issues	Incorrect action selection - Pilot
Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Pilot
Environmental issues	Dark - Decision related to condition
Environmental issues	Dark - Effect on operation
Aircraft	Altitude - Not attained/maintained

Factual Information

History of Flight

Approach-VFR pattern base	Course deviation
Approach	Controlled flight into terr/obj (CFIT) (Defining event)

On September 18, 2016, about 2031 central daylight time, a Cessna 182T airplane, N2012F, impacted terrain during a visual approach to the Ephraim-Gibraltar Airport (3D2), Ephraim, Wisconsin. The private pilot and the passenger were fatally injured, and the airplane was destroyed. The airplane was registered to Keller Aviation LLC and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Night visual meteorological conditions prevailed for the flight, which departed from the Green Bay-Austin Straubel International Airport (GRB), Green Bay, Wisconsin, at 2003 on an instrument flight rules (IFR) flight plan.

According to the pilot's friends, he flew the passenger, who was a student pilot, from 3D2 to GRB earlier that day for a lesson with a flight instructor. According to Federal Aviation Administration (FAA) air traffic control information, on the return flight from GRB, at 2023, the pilot cancelled his IFR flight plan during the descent to 3D2. Air traffic control radar showed the airplane descend to about 150 ft above ground level (agl) while on an extended right base to runway 14. The airplane continued straight ahead and crossed the final approach course to runway 14 about 1,500 ft from the approach end. After crossing the final approach course, the airplane made a left turn away from the runway. The left turn continued at low altitude for 19 seconds until radar contact was lost. The last radar return was recorded at 2030 and showed the airplane about 3,800 ft northwest of the runway 14 threshold, heading away from the runway, at an altitude about 150 ft agl.

Two witnesses located northeast of 3D2 noticed the airplane approach from the southwest. One of the witnesses stated that the airplane began a left turn that "seemed a bit sharp, more like a U-turn." As the turn continued, the airplane "made a wiggle or some kind of an odd movement." The airplane "straightened out" and descended below the tree line, and the witnesses heard the sounds of a crash. The witnesses did not report hearing any unusual engine noises before the accident.

Pilot Information

Certificate:	Private	Age:	69, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 Waiver time limited special	Last FAA Medical Exam:	August 31, 2016
Occupational Pilot:	No	Last Flight Review or Equivalent:	December 14, 2014
Flight Time:	(Estimated) 920 hours (Total, all aircraft), 300 hours (Total, this make and model)		

Student pilot Information

Certificate:	Student	Age:	16, Female
Airplane Rating(s):	None	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	None	Last FAA Medical Exam:	
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:			

The pilot, age 69, held a private pilot certificate with airplane single-engine land and instrument airplane ratings. On his most recent FAA airman medical certificate application, dated August 31, 2016, the pilot reported 920 total hours of flight experience with 17.6 flight hours in the last 6 months. On December 14, 2014, he completed a flight review in the accident airplane. Pilot logbooks were not available during the investigation. According to other pilots at 3D2, the pilot told them he would be flying practice night patterns and landings on the evening before the accident, since his night currency to carry passengers had expired. The investigation was not able to determine if this currency flight occurred.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N2012F
Model/Series:	182 T	Aircraft Category:	Airplane
Year of Manufacture:	2006	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	18281769
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	September 8, 2016 100 hour	Certified Max Gross Wt.:	2348 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	3426 Hrs as of last inspection	Engine Manufacturer:	LYCOMING
ELT:	C91A installed, not activated	Engine Model/Series:	IO-540-AB1A5
Registered Owner:	KELLER AVIATION LLC	Rated Power:	290 Horsepower
Operator:	KELLER AVIATION LLC	Operating Certificate(s) Held:	Commercial air tour (136)

The airplane, serial number 18281769, was issued a standard airworthiness certificate on October 6, 2008. The airplane was equipped with a Lycoming IO-540-1ABA5 engine, serial number L-31073-48E, a McCauley 3-bladed aluminum-hub propeller, and a Garmin G1000 integrated flight information system. The airplane's last annual inspection was completed on March 2, 2016, at a total airframe time of 3,122 flight hours. The airplane's last 100-hour inspection was completed on September 8, 2016, at a total airframe time of 3,426 flight hours.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night
Observation Facility, Elevation:	3D2,763 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	20:35 Local	Direction from Accident Site:	320°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	190°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.9 inches Hg	Temperature/Dew Point:	17°C / 15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Green Bay, WI (GRB)	Type of Flight Plan Filed:	IFR
Destination:	Ephraim, WI (3D2)	Type of Clearance:	IFR
Departure Time:	20:03 Local	Type of Airspace:	Class G

At 2035, the weather observation station at 3D2 reported the following conditions: wind 190°; at 8 knots, visibility 10 miles, clear skies, temperature 17°C, dew point 15°C, and altimeter setting 29.91 inches of mercury. Sunset occurred at 1853 with the end of civil twilight at 1922 and moonrise at 2015. At the time of the accident, the moon was about 2° above the horizon and at an azimuth of 83°; with 93% of the moon's visible disk illuminated.

Airport Information

Airport:	EPHRAIM-GIBRALTAR 3D2	Runway Surface Type:	Asphalt
Airport Elevation:	763 ft msl	Runway Surface Condition:	Dry
Runway Used:	14	IFR Approach:	None
Runway Length/Width:	2697 ft / 60 ft	VFR Approach/Landing:	Unknown

3D2, located 1 mile south of Ephraim, is a nontowered airport that is open to the public. The airport is at an elevation of 763 ft mean sea level and has a 2,697-ft-long by 60-ft-wide asphalt runway designated as runway 14/32. The runway is lit with medium-intensity lighting and has no runway end identifier lights. A precision approach path indicator (PAPI) configured for a 3.5° glideslope is located on the left side of the runway.

Following the accident, a remotely-piloted aircraft was flown at various altitudes along the final approach of runway 14. No anomalies were noted with the PAPI or runway lighting.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	45.145832,-87.197219(est)

The airplane collided with 50-ft-tall trees about 3,500 ft northwest of the runway 14 threshold. The impact heading was about 112°, and the airplane came to rest inverted about 210 ft beyond the initial tree strike. A postcrash fire ensued, which consumed the inboard sections of both wings, the fuselage, and the empennage.

Flight control continuity was established for the ailerons, rudder, and elevators. The fuel system was compromised by the fire, and the fuel selector was not located. One of the propeller blades was bent slightly forward and broken free from the hub. The other two blades were straight with minimal rotational signatures. Several tree branches were found with diagonal cuts consistent with a rotating propeller.

The engine was examined at a recovery facility. The accessory case was significantly fire-damaged, and the gear train was rusted. The crankshaft was rotated by hand, and drive train continuity was established throughout the engine. Thumb compression was established on all cylinders. Cylinder Nos. 4 and 6 had low compression due to heat damage to their valve springs and push rods. The cylinders were borescope-inspected with no anomalies noted. All six fuel injector nozzles were found to be clear of debris. The propeller governor control was nearly full forward. The propeller piston was forward, and the propeller spring was extended, consistent with a low propeller pitch. The two magnetos could not be rotated due to fire damage. The top and bottom sparkplugs, Champion REM37BY, appeared normal when compared to the Champion Aviation Service Manual (AV6-R). Examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

An Appareo Stratus PRX V2, a portable unit that includes a GPS receiver, an automatic dependent surveillance-broadcast receiver, and a heading/attitude system, was recovered from the accident site. The unit had minimal damage, but its logging feature was turned off, and there was no recorded historical data.

The two Garmin G1000 displays installed in the airplane record data on memory cards; however, due to fire damage, no data could be recovered from the memory cards.

Medical and Pathological Information

According to FAA documents, at the time he applied for his most recent medical certificate in August

2016, the pilot reported having high blood pressure controlled with lisinopril and diabetes controlled with the oral medication metformin. These medications are generally considered not to be impairing. The aviation medical examiner documented that the pilot did not have any other significant medical issues. The pilot was issued a special issuance third class medical certificate with the limitation: valid for 12 months following the examination.

Review of the pilot's annual diabetic ophthalmology examination records from August 2014 through August 2016 indicated that the pilot had bilateral cataracts with mild to moderate nuclear sclerosis. The ophthalmologist's records indicated that the pilot had non-insulin dependent diabetes with no diabetic retinopathy and no pathology that affected the pilot's vision.

The Dane County Medical Examiner, Madison, Wisconsin, performed an autopsy of the pilot and determined that the pilot's cause of death was thermal injuries and inhalation of superheated gases. The pilot's heart was enlarged with 40% to 50% narrowing of the right coronary and 60% to 80% narrowing of the left anterior descending and left circumflex coronary arteries. The autopsy did not find evidence of ischemic heart muscle damage. The autopsy was limited due to the extent of injury, and the brain was not examined.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing on specimens from the pilot. The toxicology testing was negative for tested-for-drugs, alcohol, and carbon monoxide.

The 16-year-old passenger did not have nor was she required to have a medical certification. The Dane County Medical Examiner's autopsy report for the passenger documented the cause of death was thermal injuries and inhalation of superheated gases. No natural disease was identified. FAA Bioaeronautical Sciences Research Laboratory toxicology testing on the passenger was negative for tested-for-drugs, alcohol, and carbon monoxide.

Additional Information

The final approach to runway 14 at 3D2 was over an unpopulated state park bordered on three sides by water with little cultural lighting. After flying through final approach, the pilot turned left toward this dark area.

Regarding night operations, the FAA Airplane Flying Handbook, FAA-H-8083-B, states, in part:

"To fly a traffic pattern of proper size and direction, the runway threshold and runway-edge lights must be positively identified. Once the airport lights are seen, these lights should be kept in sight throughout the approach. Distance may be deceptive at night due to limited lighting conditions. A lack of intervening references on the ground and the inability to compare the size and location of different ground objects cause this. This also applies to the estimation of altitude and speed. Consequently, more dependence must be placed on flight instruments, particularly the altimeter and the airspeed indicator.

Maintain the recommended airspeeds and execute the approach and landing in the same manner as during the day. A low, shallow approach is definitely inappropriate during a night operation. The altimeter and VSI should be constantly cross-checked against the airplane's position along the base leg and final approach."

Administrative Information

Investigator In Charge (IIC):	Folkerts, Michael
Additional Participating Persons:	Jon H Weston; Flight Standards District Office; Milwaukee, WI Andrew L Hall; Textron Aviation; Wichita, KS Troy Helgeson; Lycoming Engines; Williamsport, PA
Original Publish Date:	July 16, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94027

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