Aviation Investigation Final Report

Location:	Monroe, Wisconsin	**Accident Number:**	CEN18FA216
Date & Time:	June 10, 2018, 12:01 Local	**Registration:**	N1880B
Aircraft:	Cessna T182T	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	4 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot was conducting a personal, cross-country flight. Upon arrival at the destination airport, air traffic control (ATC) cleared the pilot for a GPS approach. The controller instructed the pilot to change to the airport common traffic advisory frequency after passing the initial approach fix. The pilot acknowledged, after which point no further communications were received. The available ATC data depicted the airplane tracking the final approach course until radar contact was lost less than 2 miles from the runway due to routine radar coverage limitations. Radar contact with the airplane was not regained. Low instrument meteorological conditions prevailed, and the cloud ceiling was below the minimum descent altitude for the approach.

A witness heard the airplane immediately before the accident and described the sound as similar to an airplane performing aerobatic maneuvers. She subsequently observed a "fireball" through an opening in the tree line behind her home and immediately heard an explosion. The accident site was located about 1/2 mile north of the runway departure threshold.

Postaccident airframe and engine examinations did not reveal any anomalies consistent with a preimpact failure or malfunction.

The investigation was unable to determine whether the autopilot was engaged during the flight. However, the precise flight track and course intercepts depicted by the position data are consistent with extended portions of the flight, including the initial portion of the approach, being flown by the autopilot. While the published missed approach procedure included a left turn, the location of the accident site in relation to the runway indicated that a right turn was executed during the missed approach. This revealed that the pilot was not using the course guidance from the autopilot and was either using the autopilot in heading mode or was flying the airplane manually. Based on the witness description of an airplane performing aerobatics, it is likely that the pilot was flying the airplane manually.

Furthermore, it is probable that the airplane remained in instrument meteorological conditions during the

approach and missed approach phases of the flight. Therefore, it is likely that the pilot became spatially disoriented during the missed approach which resulted in a loss of airplane control and impact with the trees and terrain.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Spatial disorientation resulting in a loss of control during the missed approach conducted in instrument meteorological conditions. Contributing to the accident was the pilot's decision to execute an instrument approach in weather conditions that were below the approach minimums.

Findings

Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Environmental issues	Below VFR minima - Effect on operation
Personnel issues	Decision making/judgment - Pilot
Environmental issues	Below VFR minima - Decision related to condition

Factual Information

History of Flight

Approach-IFR missed approach	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On June 10, 2018, at 1201 central daylight time, a Cessna T182T airplane, N1880B, was destroyed during a collision with trees and terrain about 3/4 mile north-northwest of the Monroe Municipal Airport (EFT), Monroe, Wisconsin. The pilot and three passengers were fatally injured. The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Day instrument meteorological conditions prevailed. The flight was operated on an instrument flight rules flight plan. The flight originated from the Kenosha Regional Airport (ENW) about 1126 and was destined for EFT.

Federal Aviation Administration (FAA) air traffic control (ATC) radar position and communications data revealed that, after departing from ENW, the airplane proceeded westbound en route to EFT at a cruising altitude of 4,000 ft mean sea level (msl). The pilot requested the RNAV (GPS) Rwy 30 approach at EFT. She initially inquired about being cleared to the Davis initial approach fix (IAF). However, the controller suggested proceeding to GENZU due to weather southeast of Janesville. At 1139, the pilot was cleared to the GENZU initial approach fix on the RNAV (GPS) Rwy 30 approach into EFT. At 1150, the pilot was instructed to cross GENZU at 3,000 ft and was cleared for the approach. The airplane began a descent from 4,000 ft and subsequently leveled at 3,000 ft about 2 minutes later. At 1154, the airplane passed the GENZU initial approach fix and turned to the south-southeast along the published GPS Rwy 30 approach transition.

The pilot informed the controller that she would like to proceed to the Rockford International Airport (RFD) in the event of a missed approach. However, she later advised the controller that she wanted to go back to ENW. The controller provided alternate missed approach instructions: fly heading 090° and climb and maintain 4,000 ft. At 1155, the controller authorized the pilot to change to the airport common traffic advisory frequency and the pilot acknowledged. No further communications were received from the pilot. At 1156, the airplane passed the XOTIY intermediate approach fix and turned to the west-northwest inbound to runway 30. At 1159, the airplane passed the ZEBRU final approach fix at 2,700 ft. The final radar data point was recorded at 1201:06. The airplane was 1.90 nautical miles southeast of the runway 30 approach threshold at 1,700 ft. Radar contact was lost consistent with coverage limitations and was not regained.

A witness reported that she was at home when she heard the airplane. It sounded similar to an airplane performing aerobatic maneuvers, with a loud, high-pitched sound. She subsequently looked out of her kitchen window and observed a "fireball" through an opening in the tree line behind her home. She then heard a loud "boom" and saw thick black smoke rising above the trees.

The accident site was located in a wooded ravine about 1/2 mile north of the runway 30 departure

threshold.

Pilot Information

Certificate:	Commercial	**Age:**	81,Female
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:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	June 21, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	4600 hours (Total, all aircraft), 90 hours (Total, this make and model)		

Three pilot logbooks provided to the National Transportation Safety Board by a family representative for review were current to September 21, 2014. The family representative reported that the pilot had moved to a computer-based logbook after that point and he did not know where that data was stored. The pilot's total flight time after the final entry in the third logbook was 4,348.5 hours. The pilot had logged about 110 hours in Cessna 152 airplanes, about 385 hours in Cessna 172 airplanes, about 919 hours in Cessna 182 airplanes, about 1,625 hours in Cessna 206 airplanes, and about 1,300 hours in Cessna T206 airplanes. The logged actual and simulated instrument flight times totaled 491 and 85 hours, respectively.

On the most recent medical certificate application, dated June 2017, the pilot reported a total flight time of 4,480 hours with no flight time in the preceding 6 months. However, on the previous medical certificate application, dated April 2015, the pilot noted a total flight time of 4,600 hours with 90 hours in the preceding 6 months.

A review of the available pilot's logbooks, in conjunction with FAA records, revealed that the pilot had owned several airplanes before the accident airplane. These included a 2010 Cessna T206H, a 2004 Cessna 206H, a 1998 Cessna T206H and a 1997 Cessna 182S. Available information indicated that the accident airplane, the 2010 Cessna T206H and the 2004 Cessna 206H were equipped with Garmin G1000 avionics systems.

FAA records revealed that the pilot had two pilot deviations. One event involved an altitude deviation while operating on an instrument flight rules clearance. The pilot had stated that the airplane was not on the desired flight track due to an error in loading the flight plan into the Garmin 1000 system. She disconnected the autopilot and corrected the flight track; however, she allowed her instrument scan to deteriorate and inadvertently climbed 500 ft above the assigned altitude. The second event involved a failure to change frequencies as required by air traffic control.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N1880B
Model/Series:	T182T T	**Aircraft Category:**	Airplane
Year of Manufacture:	2012	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	T18209078
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	May 4, 2018 Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	844.3 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	TIO-540-AK1A
Registered Owner:	On file	**Rated Power:**	235 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

FAA records revealed that the pilot purchased the accident airplane in January 2017. An airframe maintenance logbook entry, dated April 2017, noted the recording tachometer time as 755.3. This was the initial logbook entry after the pilot had purchased the airplane. According to the maintenance records, the most recent annual inspection was completed on May 4, 2018, at a tachometer time of 844.3 hours.

Personnel at ENW stated that the pilot brought the airplane in for maintenance a few days before the accident noting that the engine did not shut down using the mixture control after a previous flight. Maintenance personnel reported that a visual examination did not reveal any anomalies. An engine run-up was conducted and the engine operated normally and shut-down without any difficulties at that time.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	EFT,1086 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	12:15 Local	**Direction from Accident Site:**	150°
Lowest Cloud Condition:		**Visibility**	2.5 miles
Lowest Ceiling:	Overcast / 200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	Terrain-Induced / None
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	Moderate / N/A
Altimeter Setting:	29.89 inches Hg	**Temperature/Dew Point:**	16°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Kenosha, WI (ENW)	**Type of Flight Plan Filed:**	IFR
Destination:	Monroe, WI (EFT)	**Type of Clearance:**	IFR
Departure Time:	11:26 Local	**Type of Airspace:**	Class G

Departure airport conditions, recorded at 1122, included overcast clouds at 300 ft agl, with 3 miles visibility in light rain and mist. The National Weather Service weather radar composite, valid at 1200, did not depict any defined thunderstorms along the immediate route of flight or any significant weather echoes over the accident site. A forecast for moderate turbulence below 10,000 ft msl over northern Illinois and Wisconsin was valid at the time of the accident flight. However, the available pilot reports either reported negative turbulence (smooth flight) conditions or did not mention turbulence at all.

A witness recalled that it had been misting all morning and the ground was wet. The cloud ceiling was low and "no blue sky" was visible "at all" through the overcast. A review of surface observations for EFT indicated that low instrument weather conditions prevailed from 0500 through 1555. At the time of the accident, the recorded cloud ceiling at EFT was 200 ft agl.

Airport Information

Airport:	Monroe Municipal EFT	**Runway Surface Type:**	Asphalt
Airport Elevation:	1086 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:	30	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 75 ft	**VFR Approach/Landing:**	None

The RNAV (GPS) 30 approach LNAV minimum descent altitude (MDA) was 1,480 ft msl, which was 410 ft above the runway touchdown zone elevation. The circling MDA was 1,540 ft msl, which was 454 ft above the airport elevation. The published missed approach specified a climbing left turn to 3,000 ft, direct to the DAVIS initial approach fix and hold.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	4 Fatal	**Latitude, Longitude:**	42.627777,-89.597503

The accident site was located in a wooded ravine. The debris path was oriented on an east-southeasterly heading. The main wreckage came to rest near the top of the ravine about 114 ft from the initial tree impact. The terrain rose about 20 ft from the initial tree impact to where it came to rest at the top of the ravine. The airplane was fragmented consistent with impact forces and portions of the fuselage were partially consumed by a postimpact fire.

Postaccident airframe and engine examinations did not reveal any anomalies consistent with a preimpact failure or malfunction. A detailed summary of the examinations is included in the docket associated with the accident investigation.

Medical and Pathological Information

An autopsy of the pilot was performed by the Anatomic Pathology Laboratory in Madison, Wisconsin. The pilot's death was attributed to injuries sustained in the accident. Toxicology testing performed by the FAA Forensic Sciences laboratory identified metoprolol in kidney and muscle tissues. It was negative for all other substances in the testing profile. Metoprolol is commonly prescribed to control high blood pressure and is considered not to be impairing.

Additional Information

Spatial Disorientation
The FAA Civil Aeromedical Institute's publication, "Introduction to Aviation Physiology," defines spatial disorientation as a loss of proper bearings or a state of mental confusion as to position, location, or movement relative to the position of the earth. Factors contributing to spatial disorientation include changes in acceleration, flight in instrument meteorological conditions (IMC), frequent transfer between VMC and IMC, and unperceived changes in aircraft attitude.

The FAA Airplane Flying Handbook describes some hazards associated with flying when the ground or horizon are obscured. The handbook states, in part: "The vestibular sense (motion sensing by the inner ear) in particular tends to confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in the attitude of the airplane, nor can they accurately sense attitude changes that occur at a uniform rate over a period of time. On the other hand, false sensations are often generated; leading the pilot to believe the attitude of the airplane has changed when in fact, it has not. These false sensations result in the pilot experiencing spatial disorientation."

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	Peter T Hupfer; FAA Flight Standards; Milwaukee, WI Peter J Basile; Textron Aviation; Wichita, KS Troy R Helgeson; Lycoming Engines; Williamsport, PA
Original Publish Date:	November 6, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97430