Aviation Investigation Final Report

Location:	Corfu, New York	**Accident Number:**	ERA21LA003
Date & Time:	October 2, 2020, 11:44 Local	**Registration:**	N965DM
Aircraft:	Socata TBM700	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane was in cruise flight at FL280 when the instrument-rated pilot failed to contact air traffic control (ATC) following a frequency change assignment. After about 25 minutes, and when 30 miles east of the destination airport, the pilot contacted ATC on a frequency other than the one that was assigned. He requested the instrument landing system (ILS) approach at his intended destination, and the controller instructed the pilot to descend to 8,000 ft and to expect vectors for the ILS approach at the destination airport. The controller asked the pilot if everything was "okay," to which the pilot replied, "yes sir, everything is fine." The controller then observed the airplane initiate a descent. About 2 minutes later, the controller asked the pilot where he was headed, and the pilot provided a garbled response. The controller instructed the pilot to stop his descent at 10,000 ft, followed by an instruction to stop the descent at any altitude. The pilot did not respond, and additional attempts to contact the pilot were unsuccessful. The airplane impacted terrain in a heavily wooded area 17 miles from the destination airport.

All major components of the airplane were located in the vicinity of the main wreckage. Examination of the airframe and engine revealed no preimpact mechanical malfunctions or failures with the airplane that would have precluded normal operation.

The investigation was unable to determine why the pilot was not in contact with ATC for 25 minutes. The pilot's eventual contact with ATC about 30 miles from his intended destination, while still operating at his cruise altitude, suggests a clear breakdown in awareness of his position through distraction or impairment. However, upon re-establishing contact with ATC, the pilot's communications were clear, nominal, and timely, which did not suggest impairment or use of an oxygen mask. Additionally, in response to a direct query from ATC the pilot did not indicate any difficulty. Further, there was no sign of airframe depressurization and examination of the wreckage did not reveal deployment of the passenger oxygen masks.

Toxicology results were positive for ethanol at a low level, which was likely due to post-mortem production.

Meteorological data and a performance study indicated that the pilot initiated a descent through multiple cloud layers about 15 seconds after acknowledging the descent clearance. During the initial portion of the airplane's descent, its airspeed and rate of descent appeared to be nominal. About 2 minutes later, excessive airspeeds, descent rates, bank angles, and pitch attitudes were achieved. The performance study depicted the airplane entering a spiral dive during which the airplane exceeded airspeed, maneuvering, structural, and autopilot limitations. At 6,000 ft above ground level, and about 10 seconds before ground contact, the airplane descended through a final cloud layer, the descent profile shallowed, and the rate of descent decreased to 6,800 ft/min before radar data ended.

In addition, there were no clearances issued by ATC that would have required the pilot to change either the airplane's rate of descent or track about this time; however, the airplane's proximity to the destination airport may have created a heightened sense of urgency for the pilot to descend and or configure his avionics for the approach, which may have served as an operational distraction. Although it was possible that restrictions to visibility during the descent may have affected the pilot's ability to maintain positive airplane control, there is insufficient information to determine how or why the pilot lost control.

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 control of the airplane for undetermined reasons during the descent to the destination airport.

Findings

Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Enroute-descent	Loss of control in flight (Defining event)

On October 2, 2020, at 1144 eastern daylight time, a Socata TBM 700, N965DM, was destroyed when it was involved in an accident near Corfu, New York. The private pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The airplane was serviced with 173 gallons of Jet A fuel on the morning of the accident, which filled the tanks. The first flight departed Buffalo Niagara International Airport (BUF), Buffalo, New York, at 0747 and landed at Manchester Airport (MHT), Manchester, New Hampshire, at 0914, where the passenger was boarded. No services were received before the airplane departed on the accident flight.

Radar data provided by the Federal Aviation Administration (FAA) depicted its departure at 1019, and a climb to flight level (FL) 280 where it remained in level flight. Air traffic control (ATC) voice communication data revealed the pilot checked in with the Boston Air Route Traffic Control Center following a frequency change issued by a previous controller, and about 25 minutes elapsed before the pilot established communication with Buffalo Approach Control when he was about 30 miles east of BUF.

On the initial contact, the pilot told the radar controller he had lost communication with center and was level at FL280. About 1141, the controller instructed him to descend to 8,000 ft and to expect the instrument landing system (ILS) runway 23 approach; radar data show the airplane began its descent about this time. A few seconds later, the controller asked the pilot if "everything was okay…" and the pilot responded, "yes sir, everything's fine." The controller then cleared the pilot to fly direct to BUF and to expect vectors for a left downwind to the runway 23 ILS. The pilot acknowledged this clearance.

About 2 minutes later, the controller asked the pilot where he was headed, and the pilot provided a "garbled" response. The controller then instructed the pilot to stop his descent and to maintain 10,000 ft, followed by an instruction to stop his descent and to maintain any altitude. The pilot did not respond, and several additional attempts to contact the pilot were unsuccessful.

Witnesses in the area surrounding the crash site reported that the engine sound was "very loud" before the sound of impact was heard.

Pilot Information

Certificate:	Private	**Age:**	62,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	May 29, 2020
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 30, 2019
Flight Time:	(Estimated) 960 hours (Total, all aircraft), 239.2 hours (Total, this make and model)		

The pilot reported having flown 60 hours during the 6 months before his last FAA medical examination. The pilot's logbook reflected a flight on May 20, 2019, and completion of a SimCom recurrent course for the TBM850 on February 9, 2020. A summary of the logbook review revealed the pilot's hours of flight experience during the 4 years prior to the accident.

Year	Total Flight Hours	TBM Flight Hours
2016	100.2	90.1
2017	53.9	53.9
2018	70.1	70.1
2019	25.1	25.1

Aircraft and Owner/Operator Information

Aircraft Make:	Socata	**Registration:**	N965DM
Model/Series:	TBM700	**Aircraft Category:**	Airplane
Year of Manufacture:	2009	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	527
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	December 6, 2019 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1
Airframe Total Time:	1181.8 Hrs as of last inspection	**Engine Manufacturer:**	
ELT:	Installed	**Engine Model/Series:**	
Registered Owner:	On file	**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

According to FAA records, the pilot purchased the airplane in June 2016. It was powered by a Pratt & Whitney Canada PT6A-66D, 850-horsepower engine equipped with a Hartzell constant-speed propeller.

According to the airplane flight manual, the airplane was equipped with an altimetric valve that provided an automatic passenger mask actuation function at a cabin altitude between 13,000 ft and 14,000 ft when the oxygen switch was set to ON.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	BUF,716 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	11:54 Local	**Direction from Accident Site:**	265°
Lowest Cloud Condition:	Few / 2000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 6000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.97 inches Hg	**Temperature/Dew Point:**	13°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Manchester, NH (MHT)	**Type of Flight Plan Filed:**	IFR
Destination:	Buffalo, NY (BUF)	**Type of Clearance:**	IFR
Departure Time:	10:18 Local	**Type of Airspace:**	

The 1154 recorded weather observation at BUF, located about 17 miles west of the accident location, included wind from 250° at 9 knots, visibility 10 miles, few clouds at 2,000 ft above ground level (agl) and 3,500 ft agl, broken cloud layers at 6,000 ft agl and 14,000 ft agl, temperature 13°C, dew point 8°C, and an altimeter setting of 29.97 inches of mercury.

According to high-resolution rapid refresh model sounding for the accident site around 1200, the wind at FL190 was from the west about 25 knots. Relative humidity about FL190 was 33% and the relative humidity was above 90% for the entire atmosphere above about 9,000 ft. The freezing level was identified as about 5,200 ft. Calculations made by the Rawinsonde Observation Program (RAOB) did not identify any potential for icing, clouds, or significant turbulence between about 9,000 and 27,000 ft.

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:**	42.971879,-78.382376

The airplane impacted a heavily wooded, swampy area. The airplane was fragmented and damaged by postcrash fire. Wreckage and components of the airplane were buried 15 ft below the surface. All of the major components were accounted for at the scene. An odor of Jet A aviation fuel was noted at the accident site by first responders.

The fuselage was fragmented by impact forces. The door locking pins on the main cabin door were extended and the door handle was in the closed position. A passenger emergency oxygen mask was located separated from the airframe, but the mask remained inside its housing. Control cable continuity could not be confirmed due to the fragmentation of the fuselage. All sections of the cables and push-pull tubes located exhibited tensile overload fractures. The autopilot aileron and trip servos were located, and all cables exhibited tensile overload failures. A majority of each primary and secondary flight control surfaces were in the fragmented wreckage.

Both the forward and aft sections of the center wing spar were bent symmetrically about 43° aft from their original positions. The left elevator trim tab was separated from the left elevator and located in four sections. The inboard section of the right elevator trim remained attached to the elevator. The elevator trim actuators were located and measured 16mm, consistent with a neutral position. The rudder was impact separated from the vertical stabilizer. The top section of the rudder and rudder trim tab were not located. The tailcone was impact separated and located in the wreckage.

Examination of the engine revealed that the accessory gearbox and inlet case were impact-separated, and they were not located. Multiple parts of the power turbine section and compressor section of the engine exhibited rotational scoring. Multiple blades were fractured, smeared, and bent the opposite direction of travel. The fracture surfaces that were not smeared exhibited features consistent with overload.

The propeller hub was impact-separated from the engine. All five blades were impact-separated from the hub. A portion of each of the five blades was found in the wreckage.

Medical and Pathological Information

According to the autopsy report from the Office of the Medical Examiner, Monroe County, New York, the cause of the pilot's death was multiple blunt force injuries, and the manner of death was accident. The examination was limited by the extensive injuries.

Toxicology testing performed by the FAA Forensic Sciences Laboratory detected ethanol in the pilot's muscle tissue at 0.022 grams per hectogram (gm/hg). No other tested for drugs were

detected in his muscle tissue. Toxicology testing performed for the medical examiner's office was negative for ethanol and tested for drugs in the pilot's muscle tissue.

Ethanol is a social drug commonly consumed by drinking beer, wine, or liquor. It acts as a central nervous system depressant; it impairs judgment, psychomotor functioning, and vigilance. Ethanol is water soluble, and after absorption it quickly and uniformly distributes throughout the body's tissues and fluids. The distribution pattern parallels water content and blood supply of the tissue. Ethanol can be produced after death by microbial activity; sometimes in conjunction with other alcohols, such as propanol. Extensive trauma increases the spread of bacteria and raises the risk of ethanol production after death.

Additional Information

Performance Study

A performance study was conducted using airplane weight, radar, communications, and weather data. The results indicated the airplane was in cruise flight at 28,000 ft and about 190 knots calibrated airspeed (KCAS) until 1141:17, when over a 30-second span, the nose pitched down about 10° and the rate of descent increased to 4,500 ft/minute. The descent was initiated 15 seconds after the airplane was cleared to descend from its cruising altitude. The airplane maintained its assigned heading until 1143:31. At that time, the airplane descended through 19,300 ft and accelerated through its maximum operating speed of 271 KCAS.

The study showed that the airplane then entered a right banking turn that reached nearly 90°, with a pitch-down attitude of 47°. Both airspeed and rate of descent increased in the descending turn. Airspeed reached 350 KCAS and the rate of descent peaked at 28,400 ft/min at 1144:13, and then decreased to 6,800 ft/min at the end of the data. The computed normal load factor increased to about 3.8 G during the descent. The study noted the descent profile was consistent with a spiral dive.

Limitations

According to the manufacturer, the airplane autopilot engagement limitation for angle of bank was +/-45° and -15° for descending pitch angle. In addition, the autopilot operational envelope (commands limit) was +/- 25° for bank angle and -10° for descending pitch angle. Furthermore, the airplane was equipped with an emergency descent mode that, when engaged, would signal the autopilot to initiate a 90° left turn and descent up to 4,000 ft/min (depending on airplane loading, power lever positions, and weather conditions) until the airplane reached the target altitude of 15,000 ft msl.

Administrative Information

Investigator In Charge (IIC):	Kemner, Heidi
Additional Participating Persons:	Timothy Tressel; FAA/FSDO; Buffalo, NY Catherine Herau; Daher Aircraft; Paris Les Doud; Hartzell; Piqua, OH David Sebastien; Bureau d'Enquetes et d'Analyses; Le Bourget Beverley Harvey; Transportation Safety Board of Canada; Montreal Jeff Davis; Pratt & Whitney Canada; Bridgeport, WV
Original Publish Date:	August 19, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=102077

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