Aviation Investigation Final Report

Location:	Payson, Arizona	**Accident Number:**	WPR19FA007
Date & Time:	October 12, 2018, 18:45 Local	**Registration:**	N433CS
Aircraft:	Cessna T240	**Aircraft Damage:**	Destroyed
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was approaching the airport for landing around dusk in visual meteorological conditions at the conclusion of a cross-country flight. Radar data depicted the airplane at 589 ft above ground level on a downwind leg for the runway at a groundspeed of 108 knots. The airplane then entered a right turn; however, rather than aligning with the runway on a final approach leg, the airplane continued the turn through 360° and continued on an extended downwind before entering another right turn. The airplane's altitude and groundspeed was fluctuating throughout these maneuvers. Radar contact was lost near the accident site about 1 nautical mile from the end of the runway.

The airplane impacted the ground in a vertical, nose-down attitude consistent with an aerodynamic stall/spin. Damage signatures indicated that the engine was producing power at the time of the accident, and examination of the airframe and engine revealed no anomalies that would have precluded normal operation.

Analysis of the radar data revealed that the radius of the airplane's final turn was about 700 ft, which would have required a bank angle of about 50° based on the airplane's approximate speed. The data are consistent with the pilot's failure to compensate for the increased load factor during the turn and a subsequent exceedance of the airplane's critical angle of attack, which resulted in a stall/spin from which the pilot was unable to recover given the airplane's low altitude.

Probable Cause and Findings

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

The pilot's exceedance of the airplane's critical angle of attack while maneuvering for landing, which resulted in an aerodynamic stall/spin and a subsequent loss of control.

Findings

Aircraft	Angle of attack - Capability exceeded
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Approach-VFR pattern final	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On October 13, 2018, about 1845 mountain standard time, a Cessna T240 airplane, N433CS, was destroyed when it was involved in an accident in Payson, Arizona. The private pilot and passenger sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

Review of radar data provided by the Federal Aviation Administration (FAA) revealed a primary target, which was correlated with the accident airplane, on a right downwind leg for runway 24 about 580 ft above ground level (agl) at a groundspeed of 108 knots (kts). About 0.75 mile from the approach end of the runway on downwind, the airplane started a right turn about 658 ft agl and continued the turn through the base leg. The groundspeed decreased to 60 kts and the airplane lost about 100 ft of altitude throughout the turn. After completing a 360° turn, the airplane continued on an extended downwind before entering another right turn to the base leg about 526 ft agl and a groundspeed of 94 kts, descending to 490 ft agl and a groundspeed of 81 kts. The last radar target was located in the vicinity of the accident site.

Pilot Information

Certificate:	Private	**Age:**	63
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 22, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 25, 2016
Flight Time:	(Estimated) 2100 hours (Total, all aircraft)		

Passenger Information

Certificate:		**Age:**	
Airplane Rating(s):		**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

The pilot's medical certificate expired for all classes on July 31, 2018, but the pilot had applied for and completed the requirements for BasicMed.

Review of the pilot's logbook revealed that the last entry was dated October 7, 2018.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N433CS
Model/Series:	T240 No Series	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	T24002033
Landing Gear Type:		**Seats:**	
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:		**Engine Model/Series:**	TSIO-550-C
Registered Owner:		**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

The maintenance logbooks were not located. The facility that performed the most recent maintenance, on October 1, 2018, indicated that the airplane's tachometer read 543.9 hours at that time.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	KPAN,5157 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	01:55 Local	**Direction from Accident Site:**	259°
Lowest Cloud Condition:	Few / 8000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	11°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Glendale, AZ (GEU)	**Type of Flight Plan Filed:**	None
Destination:	Payson, AZ (PAN)	**Type of Clearance:**	None
Departure Time:	18:15 Local	**Type of Airspace:**	Class G

The density altitude at the accident site was about 5,900 ft.

Airport Information

Airport:	PAYSON PAN	**Runway Surface Type:**	Asphalt
Airport Elevation:	5156 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	24	**IFR Approach:**	None
Runway Length/Width:	5504 ft / 75 ft	**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	34.261665,-111.310554

The accident site was located in an urban environment 1.05 nautical miles east-northeast of Payson Airport (PAN) at an elevation of 5,100 ft msl.

Review of the photos taken by first responders revealed that the airplane impacted a house in a vertical attitude. The propeller, engine, and instrument panel were embedded into subfloors. Due to its inaccessibility and potentially hazardous conditions, the wreckage was not examined at the accident site.

Examination of the wreckage at the recovery facility revealed that the airframe was substantially fragmented. Both wings were separated into numerous pieces; the ailerons and flaps were separated from their respective wings. The empennage was separated from the fuselage and the right elevator was separated from the empennage and remained in one piece. The rudder and the left elevator remained attached to the empennage. The firewall was separated from the cabin and the instrument panel was fragmented. The landing gear structure was partially separated from the fuselage and remained in one piece. Only partial control continuity was established due to the fragmentation of the wreckage.

The engine was rotated by hand and compression was obtained on all six cylinders. Valve and gear train continuity was established throughout the engine. The top spark plug electrodes displayed coloration consistent with normal operation. The left and right magnetos produced spark at all leads. The fuel pump was operational. Fluid consistent with 100LL aviation fuel was observed in the throttle body metering unit and the fuel manifold valve. The three-blade, constant speed propeller remained attached to the crankshaft and all three propeller blades remained attached to the propeller hub; two of the blades were loose and could be rotated. One blade was bent aft and exhibited chordwise scratches on the cambered side of the blade. Another blade was twisted along the entire length and exhibited leading edge impact damage with chordwise scratches. A third blade was bent aft and displayed tip damage and multi-directional scoring on the cambered side of the blade. There was no evidence of pre-impact mechanical anomalies or malfunctions of the engine or the airframe.

Additional Information

Performance

Radar data indicated that the airplane's groundspeed as it began the final turn was 94 knots, with a turn radius of about 700 ft. Referencing Aerodynamics for Naval Aviators (NAVWEPS 00-80T-80), Figure 2.29, General Turning Performance (Constant Altitude, Steady Turn), the airplane's angle of bank would have been about 50°.

The Cessna T240 Pilot Operating Handbook indicated that, with flaps retracted, the stall speed was 73 kts (calibrated airspeed). At bank angles of 30°, 45°, and 60°, the stall speed increased to 78, 87, and 103 kts, respectively.

According to the FAA Airplane Flying Handbook (FAA-H-8083-3B):

At the same gross weight, airplane configuration, CG location, power setting, and environmental conditions, a given airplane consistently stalls at the same indicated airspeed provided the airplane is at +1G (i.e., steady state, unaccelerated flight). However, the airplane can also stall at a higher indicated airspeed when the airplane is subject to an acceleration greater than +1G, such as when turning, pulling up, or other abrupt changes in flightpath. Stalls encountered any time the G-load exceeds +1G are called "accelerated maneuver stalls." The accelerated stall would most frequently occur inadvertently during improperly executed turns, stall and spin recoveries, pullouts from steep dives, or when overshooting a base to final turn. An accelerated stall is typically demonstrated during steep turns.

Stalls that result from abrupt maneuvers tend to be more aggressive than unaccelerated, +1G stalls. Because they occur at higher-than-normal airspeeds or may occur at lower-than-anticipated pitch attitudes, they can surprise an inexperienced pilot…Failure to take immediate steps toward recovery may result in a spin or other departure from controlled flight.

Medical and Pathological Information

An autopsy of the pilot was performed by the Gila County Office of the Medical Examiner, Payson, Arizona. The autopsy report stated that the pilot's cause of death was "multiple blunt impact injuries."

The FAA's Forensic Sciences Laboratory conducted toxicology tests on specimens from the pilot. The results were negative for all tests performed; no drugs were identified in blood and no potentially impairing substances were found in urine.

Administrative Information

Investigator In Charge (IIC):	Smith, Maja		
Additional Participating Persons:	Daren DuFriend; FAA; Scottsdale, AZ		
Original Publish Date:	December 3, 2020	**Investigation Class:**	2
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98470		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.