



Aviation Investigation Final Report

Location:	Louisa, Virginia	Accident Number:	ERA19FA036
Date & Time:	November 4, 2018, 14:15 Local	Registration:	N38FD
Aircraft:	Titan TORNADO 1	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot of the experimental amateur-built airplane took off and made a left turn to travel north of the airport. A witness at the airport reported that the airplane sounded louder than normal during departure. About 1 minute 18 seconds after takeoff, the airplane climbed to an altitude of about 400 feet above ground level at a groundspeed of 60 knots. During the next 22 seconds, the airplane descended about 300 ft and slowed to a groundspeed of 34 knots before impacting a field. The lack of a discernable debris path, asymmetric damage to both wings, and the airplane's relatively low ground speed immediately before the accident all suggest that the airplane likely departed controlled flight after entering an aerodynamic stall and spin.

Examination of the engine revealed no preimpact mechanical malfunctions that would have precluded the engine from operating normally. The muffler had a hole measuring about 2 inches in diameter where the muffler rear mount attached to the engine. Although the pilot had a headset, if the separation of the muffler had occurred during the accident flight, the increased engine noise due to the hole in the muffler could have distracted the him, and resulted in his subsequent loss of control and an aerodynamic stall/spin.

The pilot had longstanding hypertensive cardiomyopathy, which could have increased his risk of an arrhythmia that could have caused palpitations, shortness of breath, anxiety, and/or fainting. However, the pilot's medications may have mitigated that risk. Therefore, the investigation could not determine from the available information whether the pilot's heart disease contributed to the circumstances of the accident.

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 airspeed and the airplane's exceedance of its critical angle of attack, which resulted in an aerodynamic stall and spin at a low altitude.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Angle of attack - Not attained/maintained
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Initial climb	Loss of control in flight (Defining event)
Initial climb	Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On November 4, 2018, about 1415 eastern standard time, an experimental amateur-built Titan Tornado 1 airplane, N38FD, was substantially damaged when it impacted a field during initial climb from Louisa County Airport (LKU), Louisa, Virginia. The sport pilot was fatally injured. The airplane was registered to and operated by the pilot as a Title 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed for the local flight.

A witness, who worked at the fixed-based operator at the airport, stated that she was inside the fixed-based operator and heard the accident airplane take off sometime between 1400 and 1430. She reported that the takeoff sounded louder than usual and that, as the airplane flew away from the airport area, she heard an expletive over the common traffic advisory frequency and then no further communications from the pilot. The witness also reported that she went outside to see if "something occurred" but didn't see anything. The airport manager at LKU stated that he landed his airplane about 1415, which was about the time that the accident airplane departed. About 1500, the accident airplane was located in a field about 1-mile northeast of the airport.

Pilot Information

Certificate:	Sport Pilot	Age:	70, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Single
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Sport pilot	Last FAA Medical Exam:	
Occupational Pilot:	No	Last Flight Review or Equivalent:	June 7, 2015
Flight Time:	613 hours (Total, all aircraft), 48 hours (Total, this make and model), 6 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft)		

The pilot, age 70, held a sport pilot certificate with a rating for airplane single-engine land. He was not required to have a current medical certificate as a sport pilot. A review of the pilot's logbook revealed that he had 636 hours of total flight experience, of which about 48 hours were in the accident airplane make and model. The pilot had flown about 6 hours during the 90

days preceding the accident; all of that time was in the accident airplane make and model. His last flight review occurred on June 7, 2015.

Aircraft and Owner/Operator Information

Aircraft Make:	Titan	Registration:	N38FD
Model/Series:	TORNADO 1	Aircraft Category:	Airplane
Year of Manufacture:	2016	Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	T00503SOHK0383
Landing Gear Type:	Tricycle	Seats:	1
Date/Type of Last Inspection:	March 6, 2018 Condition	Certified Max Gross Wt.:	750 lbs
Time Since Last Inspection:	21 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	265 Hrs at time of accident	Engine Manufacturer:	Rotax
ELT:	Not installed	Engine Model/Series:	503
Registered Owner:		Rated Power:	52
Operator:	On file	Operating Certificate(s) Held:	None

The single-seat, high-wing, fixed-tricycle gear airplane was assembled from a kit in January 2016. The airplane was powered by a Rotax 503 52-horsepower engine equipped with a ground-adjustable, two-blade Ivoprop propeller. A review of the maintenance records revealed that the airplane's most recent condition inspection was completed on March 6, 2018. At that time, the airplane and engine had been operated 244 hours since new. The airplane flew an additional 21 hours from the time of that inspection to the accident.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KLKU, 479 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	14:15 Local	Direction from Accident Site:	210°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	90°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.45 inches Hg	Temperature/Dew Point:	15°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Louisa, VA (LKU)	Type of Flight Plan Filed:	None
Destination:	Louisa, VA (LKU)	Type of Clearance:	None
Departure Time:	14:13 Local	Type of Airspace:	

The recorded weather at LKU at 1415 indicated the following: wind from 090° at 6 knots, visibility 10 miles, clear sky, temperature 15°C, dew point 3°C, and altimeter setting 30.46 inches of mercury.

Airport Information

Airport:	Louisa County LKU	Runway Surface Type:	Asphalt
Airport Elevation:	493 ft msl	Runway Surface Condition:	Dry
Runway Used:	09	IFR Approach:	None
Runway Length/Width:	4300 ft / 100 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	38.024444, -77.960556

The airplane came to rest on its right side and was oriented on a magnetic heading of 220°. No debris

path was observed. All major components of the airplane were accounted for at the accident site. The wing separated from the airframe, and more leading-edge damage was noted on the right side than the left side of the wing. The flaps and ailerons remained attached to the wing, and the flaps were in the retracted position. The empennage remained intact and undamaged. The elevator, elevator trim tab, and rudder remained attached. Control continuity was confirmed from all control surfaces to the cockpit area. The cockpit was crushed, but the pilot's four-point harness remained intact before it was cut by emergency response personnel. A pair of headsets was found in the cockpit.

A single 15-gallon fuel tank was located behind the pilot seat, and a strong smell of fuel was present at the accident site. The engine remained attached to the airframe and appeared undamaged. The rear-mounted propeller remained attached to the engine and was undamaged. The muffler remained attached to the engine at the front mount and was partially attached to the engine at the rear mount. The muffler had a hole that was about 2 inches in diameter, in which corrosion was present, where the muffler attached to its rear mount.

Fuel was recovered from the fuel filter and both carburetors. The fuel was clear blue and consistent in color and smell with automobile gasoline that had 1% blue two-cycle aviation oil mixed in. When the propeller was manually rotated, camshaft, crankshaft, valve train, and compression were confirmed. A test run of the engine was attempted but was unsuccessful because multiple sections of the electrical system, including the electronic ignition, had been cut by rescue personnel. The four spark plug electrodes were intact and light gray in color. Both carburetors remained intact with no anomalies noted. The engine examinations revealed no preimpact mechanical malfunctions that would have precluded normal operations.

A handheld Garmin 295 GPS was found in the wreckage and was forwarded to the National Transportation Safety Board's Vehicle Recorders Laboratory, Washington, DC, where the data were successfully downloaded. The data revealed that the accident flight lasted about 2 minutes. The airplane departed at 1756 universal coordinated time (UTC); based on witness statements regarding the time of departure, it is likely the time recorded by the GPS receiver was in error. The accident airplane made a left turn (to travel to the north) and, about 1 minute 18 seconds after takeoff, was at an altitude of about 400 feet above ground level (agl) at a groundspeed of 60 knots. The data then showed that, over the next 22 seconds, the airplane descended about 300 ft agl and slowed to a groundspeed of 34 knots. The data ended at 1758 UTC with the airplane over the accident site.

Medical and Pathological Information

An autopsy of the pilot was performed by the Department of Health, Office of the Chief Medical Examiner, Richmond Virginia. According to the autopsy report, the cause of death was blunt force trauma. The autopsy results also showed that the pilot had an enlarged heart, very mild coronary artery disease, and increased wall thicknesses for the left and right ventricle and septum. Microscopy showed scattered areas of parenchymal and perivascular fibrosis. In addition, the pilot had emphysema and severe atherosclerosis of his aorta.

Toxicology testing performed at the FAA Forensic Sciences Laboratory identified atenolol and amlodipine in the pilot's urine and blood specimens and dextropran in the pilot's urine specimens. Atenolol and amlodipine are prescription blood pressure medications that are not considered impairing.

Dextrorphan, a metabolite of dextromethorphan, would not have been impairing because the level was too low to be detected in the pilot's blood specimens. The pilot's specimens tested negative for carbon monoxide and ethanol.

Personal medical records were obtained from the pilot's primary care provider for the 3 years preceding the accident. The pilot was seen regularly during this period for various minor illnesses. He was continually treated for hypertension and high cholesterol. Beginning in 2018, he was diagnosed with neurogenic claudication resulting from spinal stenosis (narrowing of the lumbar spine that squeezes the nerves to the legs), causing pain when walking, which should not have been an issue while the pilot was sitting in the cockpit. At the time of the pilot's last routine visit in June 2018, his medications included amlodipine, atenolol, and lisinopril-hydrochlorothiazide to treat hypertension, low-dose aspirin to prevent heart attacks, and simvastatin to treat cholesterol. None of these medications are considered impairing.

Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	Nikolas B Kubli; FAA/FSDO; Richmond, VA
Original Publish Date:	April 20, 2020
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=98594

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](#).