Aviation Investigation Final Report

Location:	Minneola, Florida	**Accident Number:**	ERA19FA256
Date & Time:	August 23, 2019, 11:15 Local	**Registration:**	N9143M
Aircraft:	MORIARTY MARVIN AVENTURA II	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

According to the pilot's son, he and his father were working on the experimental, amateur-built airplane's carburetor the day before the accident to improve the fuel consumption. They replaced the carburetor jets with smaller ones, but that change made the engine run roughly. On the morning of the accident, the pilot told his son that he fixed the airplane by adjusting the carburetor float tabs, allowing more fuel to enter the carburetor bowl. They then performed an engine run-up, and it ran normally. The pilot's son stated that, during takeoff, the airplane was not climbing like it had in the past. When the airplane reached about 300 ft above ground level, the engine started to sputter and run roughly. He stated that it looked like his father tried to turn the airplane back to the runway and made a sharp left turn but that shortly after the turn, the airplane descended straight down to the ground.

Postaccident examination of the engine found that the choke on the carburetors was safety wired in the open position. The top spark plugs were removed and noted to be black and sooty, consistent with the engine running with an excessively rich fuel ratio. No other mechanical anomalies were noted with the engine that would have precluded normal operation. Given the available information, it is likely that the pilot's modifications to the airplane's engine resulted in it running excessively rich, which resulted in the partial loss of power and engine roughness that occurred during the takeoff. Additionally, the pilot exceeded the airplane's critical angle of attack while attempting to return to the airport, which led to an aerodynamic stall and impact with terrain.

Toxicological testing revealed Delta-9-THC (tetrahydrocannabinol, the active compound in marijuana) in the pilot's blood and liver specimens; however, it could not be determined if the pilot's marijuana use impacted his behavior or decision making before or during the accident flight.

Probable Cause and Findings

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

The pilot’s improper modifications to the airplane’s engine, which resulted in the partial loss of engine power. Contributing to the outcome was the pilot's exceedance of the airplane’s critical angle of attack during an attempted return to the airport following a partial loss of engine power, which resulted in an aerodynamic stall and impact with terrain.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Angle of attack - Capability exceeded
Personnel issues	Modification/alteration - Pilot
Aircraft	Fuel control/carburetor - Incorrect service/maintenance

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Initial climb	Loss of engine power (partial) (Defining event)
Emergency descent	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On August 23, 2019, about 1115 eastern daylight time, an experimental amateur-built Aventura II airplane, N9143M, was substantially damaged when it was involved in an accident near Minneola, Florida. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot's son, he and his father had assembled the airplane. He stated that they had installed an after-market supercharger on the engine several months before the accident, and the airplane had been flying well since then. He further stated that, about 2 days before the accident, his father said the airplane had been consuming fuel at a higher-than-normal rate (about 6 gallons per hour as opposed to the normal 4 gallons per hour). On the day before the accident, he and his father replaced the jets in the carburetor with smaller jets to attempt to improve the fuel consumption. After they replaced the jets, they started the engine, and it was running roughly (coughing and missing).

The pilot’s son stated that the next morning, when he arrived at Florida Flying Gators Airport (3FD4), Minneola, Florida, his father told him he had fixed the airplane by adjusting the tabs on the carburetor float bracket and allowing more fuel to enter the carburetor bowl. They performed a run-up of the engine, and it ran normally. He stated that his father planned to fly to DeLand Municipal Airport-Sidney H Taylor Field (DED), DeLand, Florida, and that he would drive a truck and trailer there to meet him. He watched his father start his takeoff roll on runway 36. He stated that the takeoff looked normal but that the airplane was not climbing like it had in the past. When the airplane reached about 300 ft above ground level, the engine started to sputter and run roughly. He stated that it looked like his father tried to turn back to the runway and made a sharp left turn but that shortly after the left turn, the airplane descended straight down to the ground.

The airplane came to rest about 200 yards from the end of runway 36. The wreckage was oriented on a 270° magnetic heading, and all major components were located with the main wreckage. Flight control continuity was verified from the cockpit to all primary flight control surfaces.

Examination of the wreckage revealed that the airplane impacted the ground in an almost vertical nose-down attitude. The nose of the airplane was fractured in several pieces, and the instrument panel was destroyed; the instruments were found in the grass beside the main wreckage. The landing gear was extended. The wing was impact damaged, and the fabric was torn down the entire length of the wing. The aluminum tubing inside the wing structure was fractured off and had torn through the wing fabric

material. The engine was fractured off the engine mounts and remained connected through the wiring and cables from the throttle and mixture controls. The engine was found inverted, and automotive gasoline was pouring out of the fractured fuel lines. The three-blade composite propeller remained attached to the engine, and one propeller blade was fractured mid-blade by impact forces. Both carburetors were fractured off the induction system and connected by only the throttle linkage. The tail section of the airplane did not contact the ground and was undamaged.

Further examination of the engine found that the choke on the carburetors was safety wired in the open position. The right exhaust gas temperature probe was cut off at the exhaust pipe. A new temperature probe was drilled into the exhaust pipe and clamped to the pipe with two worm-style, stainless-steel clamps. The supercharger spun freely, and no binding was noted. The top spark plugs were removed and noted to be black and sooty from exhaust gases. Thumb compression was established on all cylinders. A lighted boroscope was used to examine the cylinders, valves, and pistons; no anomalies were noted.

The pilot had reported 306 total flight hours to the Federal Aviation Administration (FAA) at the time of his most recent medical examination but had reported no chronic medical conditions and no use of medications.

According to the autopsy performed by the State of Florida Medical Examiner, Districts 5 & 24, the pilot's cause of death was multiple blunt force injuries. No significant natural disease was identified.

Toxicology testing performed by NMS Labs identified 5.8 ng/mL of Delta-9-THC (tetrahydrocannabinol, the active compound in marijuana) and 15 ng/mL of its inactive metabolite, Delta-9-Carboxy-THC, in the pilot's iliac blood.

Toxicology testing performed by the FAA's Forensic Science Laboratory identified 7.4 ng/mL of Delta-9-THC in the pilot's cavity blood, along with 16.4 ng/mL of Delta-9-Carboxy-THC and 0.9 ng/mL of 11-Hydroxy-Delta-9-THC (a psychoactive metabolite). In addition, 3 ng/ml of Delta-9-THC was identified in liver tissue, along with 107.8 ng/mL of Delta-9-Carboxy-THC. Testing for 11-Hydroxy-Delta-9-THC was inconclusive in liver tissue.

Pilot Information

Certificate:	Private	**Age:**	63,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
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:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	October 15, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 16, 2018
Flight Time:	379 hours (Total, all aircraft), 70.5 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	MORIARTY MARVIN	**Registration:**	N9143M
Model/Series:	AVENTURA II	**Aircraft Category:**	Airplane
Year of Manufacture:	2001	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	AP2A0093
Landing Gear Type:	Retractable - Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	April 1, 2019 Condition	**Certified Max Gross Wt.:**	1433 lbs
Time Since Last Inspection:	50 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	870.7 Hrs at time of accident	**Engine Manufacturer:**	ROTAX
ELT:	C91A installed, not activated	**Engine Model/Series:**	912ULS
Registered Owner:	On file	**Rated Power:**	150 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KORL,112 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	15:15 Local	**Direction from Accident Site:**	102°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	30°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	30°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Minneola, FL (3FD4)	**Type of Flight Plan Filed:**	None
Destination:	Deland, FL (DED)	**Type of Clearance:**	None
Departure Time:	11:15 Local	**Type of Airspace:**	

Airport Information

Airport:	Florida Flying Gators 3FD4	**Runway Surface Type:**	Grass/turf
Airport Elevation:	30 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	2000 ft / 70 ft	**VFR Approach/Landing:**	Forced landing

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:**	28.630556,-81.804443(est)

Administrative Information

Investigator In Charge (IIC):	Boggs, Daniel
Additional Participating Persons:	Ariel Rodgigues; FAA; Orlando, FL
Original Publish Date:	June 1, 2021
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=100123