Aviation Investigation Final Report

Location:	Encino, New Mexico	**Accident Number:**	WPR20LA098
Date & Time:	March 4, 2020, 12:40 Local	**Registration:**	N505MA
Aircraft:	Flight Design CTLS	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the preflight inspection, the pilot conducted a visual fuel level check through the sight gauges in each wing. He determined that right wing had 7 gallons of fuel and the left wing had 6 gallons of fuel which he deemed was enough for a one-hour local flight. About 35 minutes after take-off, the engine started to "surge". The pilot manipulated the throttle lever several times, but there were no corresponding responses from the engine. The pilot elected to land on a nearby road; however, as he turned from base to final for the road, the engine "surged to life." The landing gear contacted the grass, and the airplane subsequently came to rest inverted.

A postaccident examination of the airplane revealed an unmeasured amount of fuel in the right wing, and the left wing appeared to be empty. The gascolator drain valve was opened and no liquid was drained. Because the gascolator was located at the lowest point in the fuel system and contained no fluid, it is likely the engine was starved of fuel. An accumulation of dirt was noted on the fuselage lower belly skin (in the vicinity where a fuel drain tube exits the engine compartment), which was consistent with evidence of a previous fuel leak. Additionally, the area around the engine-driven fuel pump also exhibited evidence of a previous leak. The location of the potential leak could not be determined based on available information.

Probable Cause and Findings

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

A partial loss of engine power due to fuel starvation, which likely resulted from a leak in the fuel system.

Findings

Aircraft	Fuel - Fluid level

Factual Information

History of Flight

Enroute	Loss of engine power (partial) (Defining event)
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On March 4, 2020, at 1240 mountain standard time, a Flight Design CTLS airplane, N505MA, was substantially damaged when it was involved in an accident near Encino, New Mexico. The pilot sustained minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

During a preflight inspection, the pilot conducted a visual fuel level check through the sight gauges in each wing. He determined that right wing had 7 gallons of fuel and the left wing had 6 gallons of fuel which he deemed was enough for a one-hour local flight. About 35 minutes after take-off, the engine started to "surge." The pilot manipulated the throttle lever several times, but there were no corresponding responses from the engine. The pilot elected to land on a nearby road; however, as he turned from base to final for the road, the engine "surged to life." The landing gear contacted the grass, and the airplane subsequently came to rest inverted, substantially damaging the wings and the fuselage.

A postaccident examination was conducted after the airplane was removed from the accident site. The engine remained attached to the airframe and all engine accessories remained attached to the engine via their respective mounts. The top spark plugs were removed and exhibited normal wear signatures. The engine crankshaft was rotated by hand using the propeller; rotational continuity was confirmed throughout the engine and valve train. Thumb compression and suction was also confirmed on all four cylinders.

The engine-driven fuel pump was disassembled and the diaphragm appeared normal. However, the fuel pump vent/overflow hose nipple was missing the drain hose which is designed to be routed to a safe neutral air pressure area. Additionally, the area around the fuel pump had evidence of a previous leak.

The gascolator drain valve was opened and no liquid was drained. Additionally, the gascolator housing was removed and the filter was missing.

Both wings were removed during the recovery operation. The right wing contained an unmeasured amount of fuel and the left wing appeared to be empty. Low air pressure applied to the right wing fuel line fitting resulted in fuel expelled through the vent tube. Low air pressure applied to the left wing resulted in no fuel or air being expelled through the vent tube. Both wing fuel tank caps remained secure; no fuel samples were obtained from the right wing.

Examination of the fuselage lower belly skin aft of the engine compartment found an accumulation of dirt in the vicinity of the fuel drain tube which exited the engine compartment in this area. A sample of the accumulated dirt was secured for further examination.

The sample of dirt was examined at the NTSB Materials Laboratory using a Fourier Transform Infrared spectrometer to collect and process infrared wavelength absorbance spectra of the unknown material. A spectral library comparison search was performed on the residue spectrum which found spectral matched to several clays. The search and the combination of spectral peaks indicate that the residue consisted mainly of soil. The presence of any hydrocarbons such as fuel or oil may have been masked by the strong spectrum of the soil present in the sample.

Pilot Information

Certificate:	Commercial	**Age:**	79,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:**	
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Sport pilot	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 2173 hours (Total, all aircraft), 329 hours (Total, this make and model), 2034.8 hours (Pilot In Command, all aircraft), 14.6 hours (Last 90 days, all aircraft), 3.9 hours (Last 30 days, all aircraft), 0.5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Flight Design	**Registration:**	N505MA
Model/Series:	CTLS Undesignated Series	**Aircraft Category:**	Airplane
Year of Manufacture:	2008	**Amateur Built:**	
Airworthiness Certificate:	Special light-sport (Special)	**Serial Number:**	F-08-05-08
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	April 6, 2019 Annual	**Certified Max Gross Wt.:**	1320 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	638 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	912 ULS
Registered Owner:	Mauldin Aviation LLC	**Rated Power:**	100 Horsepower
Operator:	Mauldin Aviation LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCQC	**Distance from Accident Site:**	20 Nautical Miles
Observation Time:	10:36 Local	**Direction from Accident Site:**	312°
Lowest Cloud Condition:	Clear	**Visibility**	
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	Unknown / Convective
Wind Direction:		**Turbulence Severity Forecast/Actual:**	Unknown / Light
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	12.8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Moriarty, NM (0E0)	**Type of Flight Plan Filed:**	None
Destination:	Moriarty, NM (0E0)	**Type of Clearance:**	None
Departure Time:	12:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	34.649261,-105.44918(est)

Administrative Information

Investigator In Charge (IIC):	Smith, Maja
Additional Participating Persons:	Geary Monckton; FAA-FSDO; Albuqueque, NM
Original Publish Date:	May 3, 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=101031