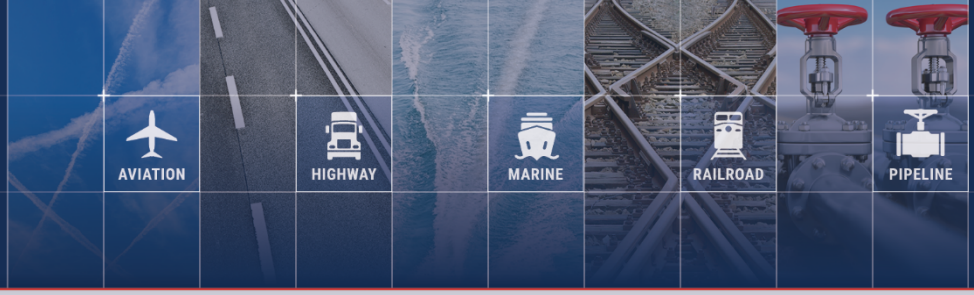

Aviation Investigation Final Report

Location:	Carrollton, Texas	**Accident Number:**	CEN12FA037
Date & Time:	October 24, 2011, 11:35 Local	**Registration:**	N227TX
Aircraft:	CIRRUS DESIGN CORP SR22T	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Fatal, 2 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Prior to the flight, the pilot did not visually verify the fuel level in the tanks during his preflight and departed with low fuel alerts on his flight displays. About 10 minutes into the flight, the pilot reported to an air traffic controller that the engine was running rough and that he needed to return to his departure airport. During a second instrument approach, the engine lost power, and the pilot attempted a forced landing to a field. The airplane impacted terrain, the right wing separated, and the airplane came to rest on its right side. No evidence of fuel or fuel spillage was observed at the accident site. According to the pilot, the management company did not fuel the airplane as he had requested. An examination and operational test of the engine was performed. No defects in engine operation were detected, and the engine produced full rated power during the test.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to adequately preflight the airplane prior to departure, which resulted in a loss of engine power due to fuel exhaustion.

Findings

Aircraft	Fuel - Fluid level
Personnel issues	Preflight inspection - Pilot

Factual Information

History of Flight

Maneuvering	Loss of engine power (total) (Defining event)
Maneuvering	Fuel exhaustion
Emergency descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On October 24, 2011, approximately 1135 central daylight time, a Cirrus SR22T single-engine airplane, N227TX, sustained substantial damage when it impacted terrain following a loss of engine power while maneuvering near Carrollton, Texas. The private pilot and one passenger sustained serious injuries and a second passenger sustained fatal injuries. The airplane was co-owned and operated by the pilot. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the 14 Code of Federal Regulations Part 91 personal flight. The flight departed the Addison Airport (ADS), Dallas, Texas, at 1058 and was destined for Houston, Texas.

According to PlaneSmart Aviation, LLC, the company that managed the airplane for the pilot and other co-owners, on August 24, 2011, the pilot requested a reservation for the airplane for October 25 and 26th. At that time, the pilot requested via electronic mail to PlaneSmart that the airplane be fueled to the "tabs or better." On September 6, 2011, the pilot changed the departure date to October 24th with the return date remaining on the 26th. There was no change to the original fuel request.

On October 19, 2011, a PlaneSmart staff pilot flew the airplane from ADS to Cincinnati, Ohio, and returned the following day. The pilot reported there was a total of 9.8 gallons of fuel on board at the time he shut down the airplane. The airplane was not flown again until the accident flight four days later.

According to a Landmark Aviation (the fixed based operator (FBO) that PlaneSmart and its customers used for fueling) line service technician, he fueled the airplane on October 18th with 51.8 gallons of fuel. On October 21st, a PlaneSmart representative contacted Landmark Aviation for a fuel request on three airplanes, to include N227TX, which was to be filled "to the tabs +5." The PlaneSmart representative asked that the airplanes be filled by 2000 on the 21st. The line service technician went to fill the airplanes; however, N227TX was not available or out on the ramp for him to service with fuel. The line service technician returned at 2040 to fuel N227TX and still did not locate the airplane. At that time, the line service technician returned to the FBO and moved N227TX's fuel request to October 22nd. The line service technician returned to work at the FBO later in the day on October 22nd. When he returned, he was not sure if N227TX had been fueled that morning, so he returned to PlaneSmart to locate the

airplane. The technician passed through the PlaneSmart ramp and did not locate N227TX. He then returned to the FBO and cancelled the fuel request. There was no record from the FBO the accident airplane had been fueled prior to the accident flight.

PlaneSmart representatives noted the pilot entered their facility approximately 1000 on the day of the accident. The pilot indicated to PlaneSmart staff he was waiting for two individuals who were traveling with him. The two individuals arrived and the airplane was observed taxiing for departure from one of PlaneSmart's shaded parking stalls. PlaneSmart representatives did not observe the pilot's actions after he and his two passengers exited the facility and the airplane began to taxi.

According to air traffic control (ATC) communications, radar data, and data extracted from the airplane's recoverable data module (RDM), at 1043, the engine was started and the white advisory alert left fuel quantity crew alerting system (CAS) message illuminated on the Garmin Perspective primary flight display (PFD). At 1043, the pilot requested an IFR clearance to David Wayne Hooks Memorial Airport (DWH), Houston, Texas. At 1056, the amber FUEL QTY CAS message illuminated on the PFD when both tanks dropped below 14 gallons. At 1058, the airplane was cleared for takeoff on runway 15.

At 1110, the pilot contacted approach control and requested a direct route back to ADS because of a rough running engine. The controller asked if the pilot wanted to declare an emergency and he replied not at this time. The pilot was then given vectors to ADS. At 1118, the approach controller asked if the pilot needed assistance on the ground at ADS and the pilot responded negative. At 1123, the pilot contacted the ADS air traffic control tower (ATCT) and the controller inquired whether he needed any assistance. The pilot responded not at this time. At 1124, ADS ATCT issued the pilot a low altitude alert while on the instrument landing system (ILS) approach to runway 15 and reported he appeared to be right of the final approach course. A few seconds later, the pilot stated he would be executing a missed approach. At 1127, the pilot was given a traffic advisory call and instructed to contact approach control. Approach control vectored the pilot for a second ILS approach to runway 15.

At 1133:03, the pilot reported to approach control that he had no glideslope indication and he needed to execute another missed approach. At 1133:21, the pilot declared an emergency and requested vectors to ADS. At 1133:47, the pilot again requested vectors to ADS. No further communications were received by ATC from the pilot. Radar data showed the airplane turned east and then north. At 1134:35, the RDM data showed the Cirrus Airframe Parachute System (CAPS) rocket deployed. The last radar contact was at 1134:41 at an altitude of 600 feet mean sea level (msl). The last data point on the RDM was recorded at 1134:44 at a global positioning system (GPS) altitude of 593 feet msl.

A witness observed the airplane flying low in a north to south direction. He heard the engine "sputter...slightly rev up" and then no sound. The airplane then made a left turn to the north, the parachute deployed, and the airplane disappeared from the witness's view.

Another witness observed the airplane flying northwest to southeast going in and out of the clouds and fog. He reported the engine sounded "sick, like it was knocking, sputtering..." The airplane came out of the clouds in level flight low to the ground. The airplane then entered the clouds and the witness lost sight of the airplane.

The airplane impacted a ditch adjacent to a railroad track next to a high school. Several witnesses at the high school observed the airplane parachute deploy and the airplane impact terrain.

The pilot reported he had no recollection of the accident or proceeding 10 days.

PERSONNEL INFORMATION

The pilot, age 40, held a private pilot certificate with airplane single-engine land and instrument ratings. The pilot's third class medical certificate was issued on December 10, 2009, with no limitations or restrictions. The pilot reported 550 total flight hours, 209 flight hours in the accident airplane make/model, and 35 actual instrument flight hours.

Planesmart records showed the pilot accumulated 87.8 flight hours in Cirrus Garmin Perspective equipped airplanes.

AIRCRAFT INFORMATION

The airplane was a 2010 Cirrus SR22T, serial number 0029. The SR22T was a four-place, single-engine, low wing, composite structure airplane. The airplane was equipped from the factory with a Garmin Perspective PFD and a Garmin Perspective multi-function display (MFD). The airplane was powered by a Continental Motors TSIO-550-K, 315-horsepower engine, and equipped with a Hartzell propeller.

The airplane was issued a standard airworthiness certificate on September 23, 2010, and was registered to the owners on April 21, 2011.

A review of the maintenance logbooks revealed that the airplane's most recent annual inspection was completed on October 14, 2011. At that time, the airplane had accumulated 474.2 total hours. According to the flight meter, the airplane had accumulated 487.8 total hours at the time of the accident.

The airplane's total fuel capacity was 94.5 gallons (47.25 gallons each tank) and total usable fuel was 92.0 gallons. Fuel quantity was sensed by fuel level sensors in each tank. Their signals are passed to a Rochester fuel gauge visible to the pilot on the center pedestal, aft of the throttle. Fuel flow was measured at the engine by a fuel flow sensor just upstream of the throttle metering valve and injector manifold. Fuel used was calculated by integrating the measured fuel flow from engine start time. Both fuel flow and fuel used were recorded by the RDM; however, fuel remaining was not recorded.

When the sensed fuel drops below 14 gallons in either tank for 60 seconds, the Rochester fuel gauge sets the appropriate left or right "Fuel Tank Low Warn" discrete on the RDM and provides the low fuel alert to the Garmin avionics for the appropriate annunciation to the pilot. The 60 second delay is used to reduce noise in the data due to fuel slosh when maneuvering. If the sensed fuel rises above the 14 gallon threshold due to fuel slosh or refueling, the discrete recorded on the RDM is deactivated and the 60 second delay is again applied if sensed fuel in a particular tank drops below 14 gallons.

In order to prevent nuisance low fuel alerts to the pilot, another 60 second delay is applied in the Garmin avionics before a white "L/R FUEL QTY" advisory is displayed on the PFD, depending on the low tank. If the sensed fuel in the other tank falls below 14 gallons, the white advisory message is replaced with an amber "FUEL QTY" caution accompanied by a double chime. If the fuel totalizer calculates total fuel below 9 gallons, a red "FUEL QTY" warning appears accompanied by a continuous chime until acknowledged. Each fuel quantity annunciation is latched and is not removed, even if acknowledged. Unlike the white advisory and amber caution messages, the red warning message is not based on sensed fuel level, but dependent on the accurate input of fuel quantity that the pilot must confirm on the initial usable fuel page during the avionics startup sequence.

METEOROLOGICAL INFORMATION

At 1147, the ADS automated weather observing system, reported the wind from 230 degrees at 4 knots, 3 miles visibility, ceiling broken at 1,400 feet above ground level, haze, temperature 19 degrees Celsius, dew point 18 degrees Celsius, and an altimeter setting of 30.23 inches of Mercury.

WRECKAGE AND IMPACT INFORMATION

The accident site was located adjacent to a single railroad track, and the airplane came to rest on its right side at a GPS elevation of 593 feet msl. The initial ground scar contained a separated section of the right wing tip. The right wing was separated from the airplane and came to rest between the initial ground scar and the main wreckage. The main wreckage consisted of the engine, left wing, fuselage, and empennage. Two of the three composite propeller blades were separated at the propeller hub and came to rest within the debris field. The Cirrus Airframe Parachute System (CAPS) was found partially deployed, and the parachute canopy came to rest in the debris field attached to the airframe. The wreckage path was oriented on a bearing of approximately 015 degrees magnetic and was about 220 feet in length.

The left wing remained attached to the fuselage. The aileron and flap remained attached to the wing. The wing tip was damaged and contained earthen debris. Flight control continuity was established to the flap and aileron. The landing gear remained attached. The fuel cap was secure and no fuel was evident in the left fuel tank.

The right wing was separated from the fuselage at the wing root. The aileron and flap remained attached to the wing. The wing tip was damaged and contained earthen debris. Flight control continuity was established to the aileron at the separated wing root. The landing gear remained attached. The fuel cap was secure and no fuel was evident in the right fuel tank.

The empennage structure was fractured and remained attached to the fuselage via control cables. The right elevator tip was bent and fractured. Flight control continuity was established to the elevator and rudder.

The fuselage was crushed and fragmented. The left door was separated and the locking mechanism was engaged. The forward two seat pans were crushed. The forward two seat restraint airbags were deployed. The rear seats were not equipped with restraint airbags. The instrument panel and display units were crushed and deformed. The throttle and mixture were in the full forward position, and the fuel boost pump was on. The fuel selector handle was separated and the selector valve was found in the right tank position. The flap actuator was found in the flaps up position.

The CAPS system was found partially deployed and attached to the airplane. The airframe cover and parachute bag were found approximately 1,000 feet south of the main wreckage. The CAPS handle was found pulled.

The engine was partially separated from the fuselage. The propeller was rotated by hand and mechanical continuity was established throughout the engine. The propeller remained attached to the crankshaft.

Examination of the accident site on the day following the accident revealed no evidence of fuel spill/foliage blight in the vicinity of the right wing or main wreckage.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the passenger by the Tarrant County Medical Examiner on October 25, 2011. The cause of death was reported as craniocervical dislocation due to backseat passenger of a small airplane that crashed.

Toxicological specimens were not retained from the pilot.

TEST AND RESEARCH

The airplane contained a Cirrus RDM which was a crash hardened flight recording device installed in the tail that recorded flight information. The RDM stored over 145 hours of flight data at a 1 Hz recording rate. The recorder was in good condition and the data were extracted normally from the recorder. In addition to the RDM, seven SD cards were recovered from the airplane.

When an SD card is inserted into the top slot of the Garmin Perspective MFD, flight data is logged to the card at a recording rate of 1 Hz. A separate data file is created at each power cycle. Six of the seven SD cards contained various navigation and terrain databases for use with the G1000 avionics. One SD card contained 445 data files dating back to January 2011.

A review of the accident flight data indicated that both navigation radios were tuned to 110.10 MHz prior to takeoff and remained on that frequency for the entire flight. That frequency was the same as the ADS runway 15 ILS frequency. The SD cards were in good condition and the data were extracted normally.

The recorded data were examined for the four flights prior to the accident flight to asses fuel use. The following depicts those flights:

October 20, 2011 - Fuel Used - 82.4 gallons
October 19, 2011 - Fuel Used - 78.5 gallons
October 16, 2011 - Fuel Used - 51.4 gallons
October 14, 2011 - Fuel Used - 43.5 gallons

According to the data, there was a brief engine power back cycle on the ground on October 19th, lasting approximately 2 minutes and using 0.1 gallons of fuel calculated by the fuel totalizer. There were other periods where the airplane was powered on the ground before the flight on October 19th, but there was no indication the engine was running.

On December 6, 2011, an examination and functional test were conducted on the engine at the Continental Motors facility in Mobile, Alabama. The NTSB investigator-in-charge was present for the preparation and engine functional test. Due to impact damage, the following components were replace and/or cleaned: both right side engine mounts replaced, exhaust system crushed and replaced, turbo chargers were cleaned and reinstalled, fuel pump inlet fitting broke and replaced, starter and starter adapter were replaced, and oil sump. The engine was mounted in an engine test cell and test run at various power settings from idle to full power. No anomalies were noted during the engine test run that would have precluded normal engine operation.

ADDITIONAL INFORMATION

The airplane was managed by PlaneSmart Aviation of Addison for the owners of the airplane. The management program provided services to the owners to include, but not limited to, cleaning, maintenance coordination, hangar service and scheduling. PlaneSmart Aviation had no operational control for the accident flight.

Pilot Information

Certificate:	Private	**Age:**	40,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	December 10, 2009
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	550 hours (Total, all aircraft), 209 hours (Total, this make and model), 453 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N227TX
Model/Series:	SR22T	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0029
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 14, 2011 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	487.8 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-550-K
Registered Owner:	On file	**Rated Power:**	315 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ADS,644 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	11:47 Local	**Direction from Accident Site:**	150°
Lowest Cloud Condition:	1400 ft AGL	**Visibility**	3 miles
Lowest Ceiling:	Broken / 1400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	230°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.22 inches Hg	**Temperature/Dew Point:**	19°C / 18°C
Precipitation and Obscuration:			
Departure Point:	Addison, TX (ADS)	**Type of Flight Plan Filed:**	IFR
Destination:	Houston, TX (DWH)	**Type of Clearance:**	IFR
Departure Time:	10:58 Local	**Type of Airspace:**	Unknown

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal, 1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 2 Serious	**Latitude, Longitude:**	32.968334,-96.836387(est)

Administrative Information

Investigator In Charge (IIC):	Sauer, Aaron
Additional Participating Persons:	Harry M Steinfeldt; Federal Aviation Administration; Dallas, TX Brannon D Mayer; Cirrus Aircraft; Duluth, MN Chris Lang; Continental Motors, Inc.; Mobile, AL
Original Publish Date:	January 31, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=82147