Aviation Investigation Final Report

Location:	Kennesaw, Georgia	**Accident Number:**	ERA19LA057
Date & Time:	November 29, 2018, 18:55 Local	**Registration:**	N597CP
Aircraft:	Cirrus SR22	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the descent from 17,500 ft mean sea level (msl), as the airplane was passing through about 7,500 ft msl, the pilot felt a jolt from the engine and subsequently received a low oil pressure alert. The pilot diverted to a closer airport and continued the descent. When the airplane was about 2,000 ft msl, the pilot felt additional jolts and observed sparks emanating from the engine cowling area. Shortly thereafter, the engine lost total power. With no clear landing area available in nighttime conditions over an urban area, he activated the whole-airframe parachute system, and the airplane impacted trees and terrain with the parachute deployed. The fuselage, wings, and empennage sustained substantial damage.

Examination of the engine crankcase revealed a fracture hole at the No. 6 cylinder, and the connecting rod had sheared from the upper crankshaft bearing. Disassembly of the engine and its components revealed that the left turbocharger had seized; rub marks were observed inside the turbine housing; metal contaminants were found inside the oil filter; and the oil sump contained damaged connecting rod ends, valve lifters, and engine bearings. The damage is consistent with an oil circulation interruption and catastrophic engine failure. The source of the interruption of oil circulation to the engine could not be determined after engine disassembly.

Probable Cause and Findings

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

The total loss of engine power due to the interruption of oil circulation for reasons that could not be determined based on the available evidence.

Findings

Aircraft	(general) - Failure
Aircraft	(general) - Malfunction
Environmental issues	Tree(s) - Contributed to outcome

Factual Information

History of Flight

Enroute-descent	Miscellaneous/other
Approach-VFR pattern base	Loss of engine power (total) (Defining event)
Approach-VFR pattern base	Miscellaneous/other
Approach-VFR pattern base	Collision with terr/obj (non-CFIT)

On November 29, 2018, at 1855 eastern standard time, a Cirrus SR-22, N597CP, was substantially damaged when it impacted terrain after the Cirrus Airframe Parachute System (CAPS) was deployed near Kennesaw, Georgia. The private pilot and passenger sustained minor injuries. The airplane was registered to and operated by Cavern Aviation LLC. under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Night visual meteorological conditions prevailed, and a visual flight rules flight plan was filed for the flight, which originated from Johnson County Executive Airport (OJC), Olathe, Kansas, about 1610, and was destined for Dekalb-Peachtree Airport (PDK), Chamblee, Georgia.

The pilot reported that during the descent from 17,500 ft mean sea level (msl), about 7,000 ft msl and 20 nautical miles from PDK, he felt the engine "jolt" and subsequently received a low oil pressure warning message. Prior to the notification, all engine instruments had been in the normal range throughout the flight. The pilot reduced the throttle and notified Cobb County International Airport (RYY), Kennesaw, Georgia, of his intentions to divert and land. While on an extended base leg for runway 27 at RYY, about 2,000 ft msl, the pilot felt another engine jolt and observed sparks emanating from the engine cowling area. Shortly thereafter, the engine jolted a third time, and lost all power. With no clear landing area in-sight, he activated the CAPS and prepared for impact. Subsequently, the CAPS deployed, and the airplane impacted trees and terrain.

Engine data extracted from the primary flight display was consistent with what the pilot reported. As the airplane was descending through about 7,500 ft msl, about 6 minutes prior to the loss of engine power, oil pressure decreased from about 44 psi to 15 psi over the course of about one minute. Oil pressure continued to gradually decline to zero for the remainder of the recorded data. All other engine parameters remained nominal throughout the flight until the loss of engine power occurred.

According to Federal Aviation Administration (FAA) airman records, the pilot held a private pilot certificate with instrument airplane privileges. He was issued an FAA third-class medical certificate in January 2014. The pilot reported 899 total flight hours, all of which were in the accident airplane. His most recent flight review was in October 2017.

According to FAA airworthiness records, the low-wing airplane was powered by a Continental Motors IO-550-N engine equipped with a Tornado Alley Turbo turbonormalizing system. The most recent annual and 100-hour inspections were completed in October 2018. The Cirrus Recoverable Data Module

(RDM) was recovered; however, the RDM only contained data from more than 3 years prior to the accident.

According to Cirrus Mandatory Service Bulletin SB 2X-31-05 R2, released August 27, 2009, which was applicable to the accident airplane, the RDM was required to be removed and replaced with a new RDM (Part No. 24618-005) to correct for a potential software issue that caused it to fail to store data correctly. The RDM removed from the accident airplane was an older RDM with a part No. 24618-002.

According to a maintenance endorsement record, during the October 2018 100-hour inspection, an oil intake leak was discovered on the left (pilot side) turbocharger. The maintenance record stated that a gasket was removed and replaced on the turbocharger. On November 15, 2018, a maintenance record stated that the oil and filter were replaced; during an engine run-up after the work, no leaks were found.

The 1848 weather conditions reported at RYY, about 1.6 miles south of the accident site, included visibility 10 statute miles, scattered clouds at 4,000 ft above ground level (agl), broken clouds at 5,000 ft and 9,000 ft agl, wind 050° at 4 knots, temperature 11°C, dew point 4°C, barometric pressure 30.08 inches of mercury.

According to the Astronomical Applications Department at the United States Naval Observatory, the end of civil twilight was at 1756.

According to an FAA inspector who examined the airplane at the accident site, the CAPS had deployed, and the airplane impacted trees during the descent. The airplane came to rest upright and the fuselage, wings, and empennage sustained substantial damage. The engine crankcase at the No. 6 cylinder displayed a fracture hole and the connecting rod had sheared from the upper crankshaft bearing. There was no evidence that oil had sprayed along the fuselage or windscreen. Fragments of the upper cowling were located about 720 ft northwest of the main wreckage.

Examination of the engine revealed that thumb compression and suction could not be established, as the engine could not be rotated by hand due to internal mechanical damage. Further disassembly of the engine and its components revealed that all intake and exhaust valves were intact and exhibited normal combustion signatures. The spark plugs displayed normal operating and combustion signatures, the magnetos tested normal during a bench test, the fuel pump rotated normally, and no debris was noted in the fuel manifold valve fuel screen. Several connecting rod's and bearings were damaged and exhibited signatures of extreme high heat.

The engine oil pump's gears were observed to be intact; however, metal contaminants were observed inside the oil filter and the oil pump's housing exhibited damage consistent with hard particle passage. The oil sump displayed several small protrusions from the inside out. When the oil sump was removed, damaged connecting rod ends, valve lifters, and engine bearings were discovered.

Examination of the left turbocharger revealed that it could not be rotated by hand; the turbine and compressor wheel/housing exhibited rub marks, with corresponding blade tip damage on the turbine and compressor wheels, which indicated the marks occurred while the turbine was rotating. The left turbocharger oil supply check valves were functionally tested and operated properly.

The right turbocharger rotated freely, and no remarkable external damage was observed. The right turbocharger oil supply check valves were functionally tested and operated properly.

Pilot Information

Certificate:	Private	**Age:**	44,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
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:**	January 29, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 26, 2017
Flight Time:	898.5 hours (Total, all aircraft), 898.5 hours (Total, this make and model), 763 hours (Pilot In Command, all aircraft), 47 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cirrus	**Registration:**	N597CP
Model/Series:	SR22 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	2008	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3359
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 4, 2018 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	1969.8 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-N
Registered Owner:		**Rated Power:**	310 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KRYY,1040 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	18:48 Local	**Direction from Accident Site:**	20°
Lowest Cloud Condition:	Scattered / 4000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 5000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	50°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	11°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Olathe, KS (OJC)	**Type of Flight Plan Filed:**	VFR
Destination:	Atlanta, GA (PDK)	**Type of Clearance:**	VFR
Departure Time:	16:10 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Cobb County Intl-Mccollum Fiel RYY	**Runway Surface Type:**	Concrete
Airport Elevation:	1040 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:	27	**IFR Approach:**	None
Runway Length/Width:	6295 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	34.039443,-84.58583(est)

Administrative Information

Investigator In Charge (IIC):	Gerhardt, Adam
Additional Participating Persons:	Mark Fayerman; FAA/FSDO; Atlanta, GA Michael H Council; Continental Motors; Mobile, AL Brannon Mayer; Cirrus Aircraft; Duluth, MN Les Dowd; Hatzell Engine Technologies; Montgomery, AL Dan Lane; Epps Air Service Inc.; Atlanta, GA
Original Publish Date:	June 29, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98704