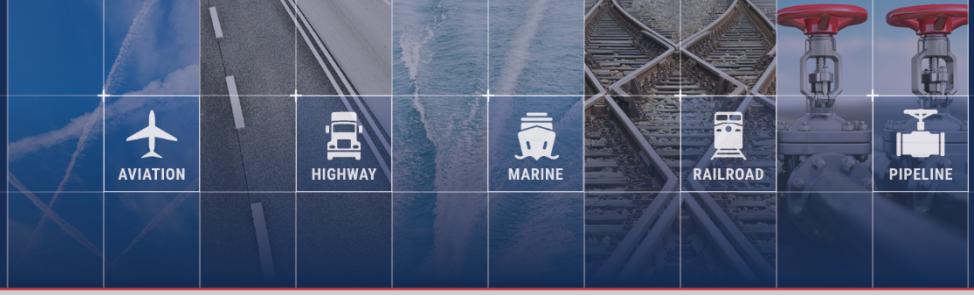

Aviation Investigation Final Report

Location:	Kennett, Missouri	**Accident Number:**	WPR18LA256
Date & Time:	September 7, 2018, 15:00 Local	**Registration:**	N131TX
Aircraft:	Cirrus SR22	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the takeoff roll, the pilot realized that his headset active noise reduction (ANR) function was inoperative. He tugged on the headset cord to access the ANR control module, but the module was stuck between his seat and the center console, and he returned his attention to continuing the takeoff. When the airplane was about 200 ft above ground level, the pilot engaged the autopilot, then leaned down to focus on freeing the control module. A few seconds later, and without freeing the module, the pilot noticed a significant decrease in engine noise and power. He sat upright, verified that the engine power and mixture levers were correctly positioned, and began scanning the instrument panel, but was unable to restore engine power. About the same time, the aural "sink rate" warning began sounding.

Based on the airplane's low altitude and his evaluation of the surrounding terrain, the pilot chose to deploy the airframe parachute system, even though the airplane’s height above the ground was below the minimum recommended deployment altitude. The airplane impacted the ground under canopy, resulting in substantial damage to the fuselage.

It is likely that, during his attempt to free the headset control module, the pilot inadvertently and unknowingly repositioned the unguarded three-position fuel pump control rocker switch, located on the center console, to the HIGH BOOST/PRIME position. This selection resulted in the loss of engine power.

Probable Cause and Findings

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

The pilot's inadvertent activation of the fuel pump control rocker switch, which resulted in a loss of engine power shortly after takeoff. Contributing to the accident was the pilot's distraction with an entangled headset cord.

Findings

Aircraft	(general) - Unintentional use/operation
Personnel issues	Monitoring equip/instruments - Pilot
Personnel issues	Incorrect action performance - Pilot
Personnel issues	Attention - Pilot

Factual Information

History of Flight

Initial climb	Fuel related (Defining event)
Initial climb	Off-field or emergency landing

On September 7, 2018, about 1500 central daylight time, a Cirrus SR-22T airplane, N131TX, was substantially damaged when it was involved in an accident near Kennett, Missouri. The private pilot and passenger sustained minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

During the takeoff roll, the pilot realized that the noise-reduction function of his active noise reduction (ANR) headset was not operating. Because ANR function activation is controlled by a button on a control module located on the headset cord, the pilot tugged on the cord to access and engage the ANR button; however, the pilot could not operate the control module because it was wedged between his seat and the center console. The pilot continued the takeoff with the intention of waiting until he was airborne to free the module.

When the airplane was about 200 ft above ground level (agl), the pilot engaged the autopilot, which was set for a capture altitude of 3,000 ft mean sea level (about 2,700 ft agl). He then leaned down and focused on attempting to free the control module. Within a few seconds, and without freeing the module, the pilot sensed a significant decrease in engine noise and power. He sat upright, verified that the engine power and mixture levers were correctly positioned, and then began scanning the instrument panel. About the same time, the aural "sink rate" warning began annunciating. The pilot was unable to discern the cause of the engine power loss. He asked his wife (who was not a pilot but was familiar with the airplane) what their altitude was, and she promptly responded "640" ft.

The airplane was equipped with the Cirrus Airframe Parachute System (CAPS). The pilot realized that the airplane height above the ground was very close to, or possibly below, the minimum recommended CAPS deployment altitude, but he decided that, based on the surrounding terrain, CAPS deployment appeared to be his best option for survival. The extraction rocket fired, the parachute opened, and the airplane impacted the ground during its first tail-first swing after the parachute opened and came to rest upright in a field. The fuselage was substantially damaged.

The pilot noted that it was possible that he had inadvertently and unknowingly re-positioned the fuel boost pump switch, located on the center console, to the HIGH BOOST/PRIME position when he was attempting to free his headset control module.

Pilot Information

Certificate:	Private	**Age:**	62,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	4-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:**	March 16, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 1, 2018
Flight Time:	1351 hours (Total, all aircraft), 1180 hours (Total, this make and model), 1264 hours (Pilot In Command, all aircraft), 19 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cirrus	**Registration:**	N131TX
Model/Series:	SR22 T	**Aircraft Category:**	Airplane
Year of Manufacture:	2011	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0230
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	February 5, 2018 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2310 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-550
Registered Owner:	On file	**Rated Power:**	315 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Electric Fuel Boost Pump

The airplane was equipped with an electrically powered fuel boost pump. A three-position (boost, off, high boost/prime) rocker switch to control the fuel pump was located on the horizontal surface of the center console between the two forward seats, just left of the engine power lever. (see Figure 1.) The fuel pump is unpowered (off) when the switch is in its neutral position. Depressing the forward end of the switch face powers the pump in the BOOST mode, which is used for takeoff, climb, landing, and switching fuel tanks. Depressing the aft end of the switch face powers the pump in the HIGH BOOST/PRIME mode, which is used to prime the engine before engine start, and for suppressing vapor

formation in flight above 18,000 ft with hot fuel. The switch was not guarded or otherwise physically protected from inadvertent operation.

Figure 1. Fuel Boost Pump Switch

The Pilot's Operating Handbook Systems Description section entitled Fuel Pump Operation stated: "To prevent over-priming during low power settings, the system uses a lockout relay that only allows HIGH BOOST/PRIME fuel pump operation when manifold pressure is greater than 24 in. Hg," and when the engine manifold pressure exceeded 24 in. Hg, "pressing HIGH BOOST/PRIME will turn the pump on in low-speed mode."

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TKX,262 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	15:15 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Clear	**Visibility**	8 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots / 12 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	30°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Kennett, MO (TKX)	**Type of Flight Plan Filed:**	IFR
Destination:	Ann Arbor, MI (ARB)	**Type of Clearance:**	None
Departure Time:	15:09 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Kennet TKX	**Runway Surface Type:**	
Airport Elevation:	262 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:	18	**IFR Approach:**	None
Runway Length/Width:	3012 ft / 75 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:**	36.225833,-90.036666(est)

Examination of the wreckage revealed that the CAPS parachute was still attached to the airplane. The engine and cowling were almost completely fracture-separated from the fuselage. The windshield was fractured into multiple pieces. The headset cord was wrapped around the engine power lever, and the

fuel pump switch was in the HIGH BOOST/PRIME position. No other non-impact damage or abnormalities were observed.

Additional Information

Cirrus Post-Accident Actions

About 4 months before the accident, Cirrus began implementing software changes intended to prevent improper operation of the electric fuel boost pump. The approach consisted of a software-controlled lockout feature that was to be retroactively applied to all SR22T model Cirrus airplanes via service bulletins (SBs). The revised software locks out the high boost function of the pump (when HIGH BOOST/PRIME is selected) until the airplane reaches a pressure altitude of 10,000 feet; this prevents an engine power loss at low altitudes due to improper selection of HIGH BOOST/PRIME.

The SBs differed slightly as a function of whether the airplanes were equipped with the "Perspective" or "Perspective Plus" avionics platforms. Perspective Plus-equipped airplanes were first addressed by SB2X-42-14, issued on May 30, 2018. Perspective-equipped airplanes (the accident airplane model) were first addressed by SB2X-42-15, issued on November 14, 2018, about 2 months after the accident. That SB was superseded by SB2X-42-17, issued on March 18, 2019. SB2X-42-16, issued February 1, 2019, addressed a total of 48 new-production model year 2019 airplanes. Although Cirrus categorized all these SBs as "mandatory," compliance was not mandated by the FAA. All subsequent new-production Cirrus airplanes are equipped with the lockout software.

Administrative Information

Investigator In Charge (IIC):	Huhn, Michael
Additional Participating Persons:	William Grubb; FAA; St Louis, MO Louie Bettis; FAA; St Louis, MO Brannon Mayer; Cirrus Aircraft; Duluth, MN Christopher Lang; Continental Motors; Mobile, AL
Original Publish Date:	June 10, 2021
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=98263