Aviation Investigation Final Report

Location:	Pembroke Park, Florida	**Accident Number:**	ERA20LA297
Date & Time:	August 28, 2020, 09:02 Local	**Registration:**	N900DT
Aircraft:	Rockwell 500	**Aircraft Damage:**	Destroyed
Defining Event:	Fuel exhaustion	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The pilot-in-command seated in the right seat was providing familiarization in the multi-engine airplane to the left seat pilot during a flight to a nearby airport for fuel. Shortly after takeoff, one of the pilots reported an engine problem and advised that they were diverting to a nearby airport. A witness along the route of flight reported hearing the engines accelerating and decelerating and then popping sounds; several witnesses near the accident site reported hearing no engine sounds. The airplane impacted a building and terrain about 10 minutes after takeoff. Very minimal fuel leakage on the ground was noted and only 23 ounces of aviation fuel were collected from the airplane's five fuel tanks. No evidence of preimpact failure or malfunction was noted for either engine or propeller; the damage to both propellers was consistent with low-to-no power at impact.

Since the pilot could not have visually verified the fuel level in the center fuel tank because of the low quantity of fuel prior to the flight, he would have had to rely on fuel consumption calculations since fueling based on flight time and the airplane's fuel quantity indicating system. Although the fuel quantity indications at engine start and impact could not be determined postaccident from the available evidence, if the fuel quantity reading at the start of the flight was accurate based on the amount of fuel required for engine start, taxi, run-up, takeoff, and then only to fly the accident flight duration of 10 minutes, it would have been reading between 8 and 10 gallons. It is unlikely that the pilot, who was a chief pilot of a cargo operation and tasked with familiarizing company pilots in the airplane, would have knowingly initiated the flight with an insufficient fuel load for the intended flight or with the fuel gauge accurately registering the actual fuel load that was on-board.

Examination of the tank unit, or fuel quantity transmitter, revealed that the resistance between pins A and B, which were the ends of the resistor element inside the housing, fell within specification. When monitoring the potentiometer pin C, there was no resistance, indicating an open circuit between the wiper and the resistor element. X-ray imaging revealed that the

conductor of electrical wire was fractured between the end of the lugs at the wiper and for pin C. Bypassing the fractured conductor, the resistive readings followed the position of the float arm consistent with normal operation. Visual examination of the wire insulation revealed no evidence of shorting, burning or damage. Examination of the fractured electrical conductor by the NTSB Materials Laboratory revealed that many of the individual wires exhibited intergranular fracture surface features with fatigue striations in various directions on some individual grains.

It is likely that the many fatigue fractured conductor strands of the electrical wire inside the accident tank unit or fuel transmitter resulted in the fuel gauge indicating that the tanks contained more fuel than the amount that was actually on board, which resulted in inadequate fuel for the intended flight and a subsequent total loss of engine power due to fuel exhaustion. The inaccurate fuel indication would also be consistent with the pilot's decision to decline additional fuel before departing on the accident flight.

While the estimated fuel remaining since fueling (between 15 and 51 gallons) was substantially more than the actual amount on board at the start of the accident flight (between 8 and 10 gallons), the difference could have been caused by either not allowing the fuel to settle during fueling, and/or the operational use of the airplane. Ultimately, the fuel supply was likely completely exhausted during the flight, which resulted in the subsequent loss of power to both engines.

Given the circumstances of the accident, the effects from the right seat pilot's use of cetirizine and the identified ethanol in the left seat pilot, which was likely from sources other than ingestion, did not contribute to this accident.

Probable Cause and Findings

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

A total loss of engine power due to fuel exhaustion. Contributing to the fuel exhaustion was the fatigue fracture of an electrical wire in the tank unit or fuel transmitter, which likely resulted in an inaccurate fuel quantity indication.

Findings

Aircraft	Fuel - Fluid level
Aircraft	Fuel quantity sensor - Fatigue/wear/corrosion

Factual Information

History of Flight

Enroute-cruise	Fuel exhaustion (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On August 28, 2020, about 0902 eastern daylight time, an Aero Commander 500-S, N900DT, was destroyed when it impacted a building near Pembroke Park, Florida. The commercial pilot and airline transport pilot were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (*CFR*) Part 91 familiarization flight.

The purpose of the flight was for the right-seat pilot, who was pilot-in-command, to familiarize the left-seat pilot with the airplane. Two individuals associated with the facility that maintained the airplane asked the pilot whether he wanted to fuel the airplane or have it towed to the fuel pump. The pilot responded that he planned to fuel the airplane at the intended destination, Miami-Opa Locka Executive Airport (OPF), Miami, Florida.

According to Federal Aviation Administration (FAA) Automatic Dependent Surveillance – Broadcast (ADS-B) and air traffic control information, after takeoff about 0852, the airplane proceeded in a southeast direction to the shore, then flew in a south-southwest direction just offshore. About 0858, when the airplane was about 13 nautical miles northeast of OPF, an occupant of the airplane contacted the OPF air traffic control tower and advised the controller that the airplane was inbound. The airplane continued in a south-southwesterly direction while climbing to 1,100 ft mean sea level (msl). At 0859:49, or 1 minute 49 seconds after the initial contact with the tower controller, an occupant advised the controller of an “engine problem” and that they would be diverting to North Perry Airport (HWO), Hollywood, Florida. The controller approved the frequency change and initially coordinated with Miami Approach and advised the facility that the airplane was descending, with a last reported altitude of 300 ft. At 0859:53, the airplane turned to the southwest and climbed to about 1,250 ft msl. A witness located about 2.8 nautical miles east-southeast of the flightpath reported hearing the engines accelerating and decelerating, which changed to a popping sound. The airplane continued flying out of his earshot.

The ADS-B data reflected that, at 0900:47, the airplane turned and flew in a west-northwesterly direction until 0901:58, when it proceeded in a north-northwesterly direction until near the accident site. Witnesses on a golf course north of the accident site reported seeing the airplane flying in a westerly direction with no sound coming from the engines. They noted that the airplane banked left and descended. Another witness, located about 440 ft northeast of the accident site, reported hearing no sound from the airplane before impact. The witness reported that the right wing impacted the building and the airplane rotated to the left. The airplane then fell to the parking lot of the building. There were no ground injuries.

Other flight crew Information

Certificate:	Commercial	**Age:**	53,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	August 3, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 7, 2020
Flight Time:	(Estimated) 27780 hours (Total, all aircraft), 300 hours (Total, this make and model), 18700 hours (Pilot In Command, all aircraft), 249 hours (Last 90 days, all aircraft), 52 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Other flight crew Information

Certificate:	Airline transport	**Age:**	56,Male
Airplane Rating(s):	Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	July 21, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 18, 2019
Flight Time:	8029 hours (Total, all aircraft), 3793 hours (Pilot In Command, all aircraft), 209 hours (Last 90 days, all aircraft), 46 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

The pilot seated in the right seat was the chief pilot for a 14 *CFR* Part 135 cargo operation. He was tasked by his company to familiarize company pilots in the airplane.

The mobile phone of the left seat pilot did not contain any video of the accident date or personal data (text messages, emails, personal photos/videos, app usage) relevant to the investigation. It did contain a series of google searches and visited web pages related to airplane performance taken 5 days before the accident and one video taken 4 days before the accident, which depicted the accident airplane taxiing on an airport ramp. There was nothing anomalous about the accident aircraft's operation or condition displayed in the video.

Aircraft and Owner/Operator Information

Aircraft Make:	Rockwell	**Registration:**	N900DT
Model/Series:	500 S	**Aircraft Category:**	Airplane
Year of Manufacture:	1969	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	3056
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	August 14, 2020 Annual	**Certified Max Gross Wt.:**	6750 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	10300.9 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	IO-540-E1B5
Registered Owner:	Conquest Air Inc	**Rated Power:**	290 Horsepower
Operator:	CONQUEST AIR	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:		**Operator Designator Code:**	Q9UA

The airplane was manufactured in 1969. At the time of manufacture, certification standards specified that the fuel quantity gauge shall be calibrated to read zero during level flight when the quantity of fuel remaining in the tank is equal to the unusable fuel supply.

The airplane's fuel system comprised five interconnected synthetic rubber cells installed in the inboard and center wing sections, having a total usable capacity of 156 gallons. All fuel cells were serviced through a single filler port, located on top of the right wing above the forward fuel cell. The fuel quantity was measured by a single transmitter or tank unit installed in the center wing fuel cell and electrically connected to a fuel quantity indicator located in the instrument panel. An optional Fuel Low Level Warning System was not installed.

Section II of the maintenance manual, titled "Ground Handling, Servicing and Airframe Maintenance," contained special inspection requirements for the fuel system which indicated, "whenever any component which would effect calibration is replaced and every 1,000 hours or annual" to, "check fuel quantity system for correct calibration." It also indicated that, every 1,000 hours, the transmitter be checked for specified wiper arm tension and internal corrosion, the cover, and connector plug for safety.

The airplane's most recent annual inspection was signed off as being completed on August 14, 2020, "[in accordance with 14 *CFR* Part] 43 Appendix D, using Aero Commander 500 S [Maintenance Manual] CH 5 [inspection] checklist as a guide…." The recorded airplane total time at the annual inspection was 10,300.9 hours.

Appendix D of 14 *CFR* Part 43 specified to inspect, in part, the, "Instruments--for poor condition, mounting, marking, and (where practicable) improper operation." The Gulfstream

Aerospace Corporation Airframe and Powerplant 100 Hour Inspection Form utilized by the maintenance facility for the last annual inspection specified in part, "Check all instruments" with a mechanic's initials next to the line. Neither 14 *CFR* Part 43 Appendix D or the inspection form utilized by the facility specified calibrating the fuel quantity indicating system.

A review of nearly 51 years of available maintenance records for work performed to the tank unit or fuel quantity transmitter, fuel quantity gauge, or calibration of the fuel quantity indicating system revealed one entry on December 11, 1981. The entry indicated, in part, that a 1,000-hour inspection of the tank unit or fuel quantity transmitter was performed at an airplane total time of 3,086.0 hours. Although replacement of the fuel quantity indicator was not documented in the maintenance records, its markings indicated that it was manufactured on January 31, 1983. Thus, the airplane had been operated about 7,215 hours and nearly 39 years since the last documented work was performed to the fuel quantity transmitter and a maximum of about 37 1/2 years since the fuel quantity indicator was replaced.

The pilot was reportedly advised by maintenance personnel to operate the engines with the mixture controls full rich because both engines had been "top overhauled" in February 2019, and were still being broken in. As of the annual inspection two weeks earlier, the airplane had accrued between 2 and 33 hours since the cylinder work for both engines was performed.

According to the engine Operator's Manual, following cylinder replacement or top overhaul of one or more cylinders until a total of 50 hours has been accumulated, cruise flight should be performed at 65% to 75% power. It did not specify that the engine must be operated with the mixture control full rich, but did state that for maximum service life, cylinder head temperatures should be maintained below 435°F during high performance cruise and below 400°F for economy cruise power settings.

According to flight planning data from the Aircraft Flight Manual (AFM), the fuel required for engine start, taxi, run-up and takeoff was 25 pounds, or about 4.2 gallons. The fuel flow in terms of pounds-per-hour (pph) of each engine at 65% and 75% power varied with engine rpm and whether the fuel-to-air ratio was leaned to best power (leaned to peak exhaust gas temperature (EGT) then enrichened 150°F), or best economy (leaned to peak EGT). At 65% power, the fuel flow ranged from 74 to 92 pph. The fuel flow at 75% power ranged from 86 to 103 pph. The AFM did not have any fuel consumption data for full rich mixture settings.

The airplane was most recently fueled with 51.4 gallons of 100 low lead aviation fuel on August 19, 2020, at OPF. According to an individual who performed the fueling, the fuel request was a top off. He indicated that he completely topped off, "1 tank on the right wing while the crew was present. Also, [the accident flight right seat pilot by name] checked the fuel tank after I was done and told me that it was ok. That is when I disconnected & finished up."

Based on ADS-B data since fueling excluding the accident flight, the airplane had been operated about 3 hours 42 minutes on three separate flights, the last being August 24, 2020. In some instances, the ADS-B data did not include taxi times; therefore, the actual duration of the flights since fueling including taxi time could not be determined. The pilot of the accident flight was on board the airplane during all three flights. Fuel consumption calculations were performed using the lowest and highest fuel flow range specified by the airframe manufacturer

at 65% and 75% power, multiplied by 3.75 hours, plus fuel used for three takeoffs (12.6 gallons). The calculated total consumption since fueling, excluding the accident flight, was between about 105 and 141 gallons.

Postaccident calculations to determine the approximate amount of fuel on board to start the flight and then fly 10 minutes (accident flight duration) were performed. The calculations included the amount of fuel used for engine start through takeoff (4.2 gallons), the lowest and highest fuel flow range specified by the airframe manufacturer at 65% and 75% power, multiplied by the accident flight duration (.16 hour). Between 8 and 10 gallons were required. That amount did not include the unusable fuel amount.

A review of reports from the FAA Service Difficulty Program for the 500 series aircraft fuel system from January 1, 2012 through June 28, 2022, revealed two reports, both in 2012. One report was associated with an off-airport forced landing of a model 500B airplane due to "fuel starvation" though the fuel gauge indicated 60 gallons of fuel. A mechanic found a broken wire in the transmitter variable contact of the tank unit or fuel transmitter that was same part number as the one installed in the accident airplane. That incident was not investigated by NTSB. The other report, also associated with a 500B airplane, indicated that, as a result of the off-airport forced landing of the other airplane due to "fuel starvation," they inspected the tank unit or fuel transmitter and found a "...brittle wire on the transmitter variable contact making [intermittent] connection." The submitter suggested an internal inspection of the tank unit or fuel transmitter at 100-hour and/or annual inspections to verify that all contacts, wires, and internal parts are secure, in good condition and working properly.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HWO,9 ft msl	**Distance from Accident Site:**	4 Nautical Miles
Observation Time:	08:53 Local	**Direction from Accident Site:**	276°
Lowest Cloud Condition:	Scattered / 3000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 12000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / None	**Turbulence Type Forecast/Actual:**	Unknown / Unknown
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	31°C / 27°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pompano Beach, FL (PMP)	**Type of Flight Plan Filed:**	None
Destination:	Miami, FL (OPF)	**Type of Clearance:**	VFR flight following
Departure Time:	08:52 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	25.994443,-80.170829

Examination of the accident site by an FAA airworthiness inspector revealed an impact mark on the building which depicted the airplane in an approximate 35° right bank. The wreckage came to rest on the ground adjacent to the building. The inspector reported no smell of fuel at the accident site, but oil leakage on the ground was noted.

Examination of the wreckage revealed no evidence of fire. The front portion of the fuselage was completely fragmented due to the impact with the building. The wings were still attached but were heavily impact damaged; both engines were separated from the wings. The aft empennage was separated but remained attached by control cables and wiring. The right main landing gear was down and locked. All elevator, rudder, and left aileron flight controls remained attached. Binding was noted during check of the elevator and rudder flight controls that was attributed to impact damage. The rudder trim tab was positioned tab trailing edge left (tail-left nose right). According to a representative of the airframe manufacturer, the rudder trim tab was set to between 0 and 0.025° tab trailing edge left deflection, which would be considered 0° trim. The left elevator trim tab was set to between .5° to .75° trailing edge up deflection, while the right elevator trim tab was set to between 0° to .05° trailing edge up deflection which would be considered 0° trim. The airframe manufacturer representative stated that the difference between the left and right elevator trim tabs could only happen if the drive chain was 1 to 2 teeth off from center.

During an examination of the fuel system, 5 ounces of fuel were noted in the left front fuel tank, 11 ounces of fuel were noted in the left rear fuel tank, and 7 ounces of fuel were in the right rear fuel tank. No fuel was noted in the right front, or center fuel tank, though the bladder of the right front tank and the daily drain valve of the center fuel tank were impact damaged. No water was detected in the recovered fuel. The inspector noted very minimal fuel leakage by the left airframe fuel strainer and fractured right fuel lines.

Examination of the cockpit revealed that the fuel quantity indicator connector was broken at the indicator; the indicator case and display were destroyed by impact forces, and the pointer needle was separated from the faceplate. There was no visible needle slap mark noted on the fuel quantity gauge faceplate. The flap selector was in the down position. The hydraulically-operated left flap visually appeared to be extended between 10° and 15°, but the position at impact could not be determined. Examination of the throttle quadrant revealed that the left and right throttle controls were 3/4 full forward and full forward, respectively. The left propeller control was full forward while the right propeller control was bent to the right and

the center of the lever was midpoint of the marking for the normal operating range and feather range. Both mixture controls were full forward. The left fuel boost pump switch was on, and the left engine ignition selector was on the left magneto position.

Examination of the fuel quantity indicating system electrical wiring revealed continuity of all electrical wires from the fuel quantity indicator to the tank unit or fuel quantity transmitter, and from two wires to the dampening capacitors. An open circuit was noted between pins B to C and A to C of the tank unit, or fuel quantity transmitter, which was retained.

Examination of the tank unit or fuel quantity transmitter, part number (P/N) EA515B-1404M, revealed that the resistance between Pins A and B, which were the ends of the resistor element inside the housing, fell within 5 ohms of the specification. When monitoring the potentiometer Pin C, there was no resistance, indicating an open circuit between the wiper and the resistor element. This condition prevented operational testing. No null spots in the resistor element were identified, and the wiper maintained contact with the resistor element throughout the float arm travel. There were no visual signs of structural damage to the wires, resistor element, or wiper inside the housing. The open circuit between the back of the wiper to connector pin C did not change with slight physical movement of the electrical wire. X-ray imaging revealed the conductor of electrical wire PN EA7959 was fractured between the end of the lugs at the wiper and for pin C. Bypassing the fractured conductor, the resistive readings followed the position of the float arm consistent with normal operation. Visual examination of the wire insulation revealed no evidence of shorting, burning or damage.

A representative of the airplane manufacturer reported that, with the fractured conductor of the tank unit or fuel transmitter, the fuel gauge can read at extreme ends of the gauge or respond erratically.

Examination of the fractured electrical conductor by the NTSB Materials Laboratory revealed the estimated total length of the wire (before fracture) was within limits. After cleaning, many of the individual wires exhibited intergranular fracture surface features with fatigue striations in various directions on some individual grains. No ductile fracture features, such as microvoids, were observed on any of the wire fracture surfaces. Several wires had mechanically damaged fracture faces with few features to examine. Energy dispersive spectrometric confirmed the wire to be silver-coated copper wire.

Extensive impact damage to both engines precluded crankshaft rotation. The exhaust and intake tubing of both engines were impact damaged and partially separated. The fuel metering and magnetos for both engines were either completely or partially separated from the engine. Following removal of cylinders Nos. 2, 4, and 6 from both engines, crankshaft, camshaft, and connecting rod continuity was visually confirmed for both engines. No damage other than impact damage was noted to the cylinders, valves, valve rockers, pushrods, pistons, or piston pins. The interiors of the Nos. 1, 3, and 5 cylinders of both engines were viewed using a lighted borescope and no anomalies of either engine were noted. Examination of the fuel system components for both engines revealed no evidence of preimpact failure or malfunction. Residual fuel was noted in the fuel diaphragm area of both servo fuel injectors, while a red-colored liquid consistent with preservative oil was noted in the air side of the right servo fuel

injector. Examination of the ignition and lubrication systems of both engines revealed no evidence of preimpact failure or malfunction.

Impact marks on the preload plates for the left propeller indicated that the propeller blade angle was about 22.5°, while the impact marks on the preload plates of the right propeller indicated the propeller blade angle was between 8° to 19°. For both propellers, the low pitch stop was 12.75° + or – 0.25°, and the start lock was 18.25° + or – 1.5°. An impact mark on the right propeller low pitch stop was consistent with the blade angles at or near the low pitch angle. The damage to the blade retention pocket indicated the impact forces were predominately in the aft direction. There was no evidence of preimpact failure or malfunction of either propeller.

Medical and Pathological Information

Forensic toxicology was performed on specimens of both pilots by the FAA Forensic Sciences Laboratory and the Broward County Office of the Medical Examiner and Trauma Services.

Toxicological testing performed by the FAA identified ethanol in the left-seat pilot's brain tissue at 0.012 gm/hg, muscle tissue at 0.011 gm/hg, and urine at 0.013 grams per deciliter (gm/dL). N-propanol was detected in his urine and his tissues were reported to have exhibited putrefaction. The non-impairing over-the- counter heartburn medicine famotidine (commonly marketed as Pepcid) was detected in the submitted liver tissue and urine. Toxicology testing performed by the medical examiner's office was positive for ethanol in the liver tissue at 0.03 grams per hectogram (gm/hg); no ethanol was detected in his brain tissue. Confirmatory toxicological testing was negative for tested-for drugs in the liver tissue.

Toxicological testing performed by the FAA detected cetirizine in the right-seat pilot's liver and muscle tissue, which is a second-generation antihistamine used to relieve hay fever and allergy symptoms. It is available over the counter, commonly marketed as Zyrtec. Although designed to be less sedating, cetirizine does have some sedating properties. The elimination half-life is between 6.5 and 10 hours. The FAA provides guidance on wait times before flying after using this medication. Confirmatory toxicological testing performed by the medical examiner's office was negative for tested-for drugs in the right-seat pilot's cavity blood.

Tests and Research

A review of NTSB Case Analysis and Reporting Online (CAROL) database for accidents and incidents for the Aero Commander 500 or Rockwell 500 series airplane was performed. The search was conducted for investigations in which the probable cause was determined, and the word “fuel exhaustion” was listed in the analysis narrative. Four cases were identified. The case numbers were MKC83FA059, LAX91LA313, WPR12TA323, and CEN13FA182. None of the cases mentioned postaccident testing of the tank unit or fuel transmitter. One investigation, CEN13FA182, involved a forced landing of an Aero Commander 500B on a golf course about 5 minutes after takeoff due to fuel exhaustion. The report indicated that the fuel gauge indicated 65 gallons but only .5 gallon of fuel was drained from the fuel tanks. A finding cited was a malfunction of the “fuel quantity sensor,” but the report did not discuss postaccident testing of the sensor. The NTSB determined that the probable cause of the accident was the loss of engine power due to fuel exhaustion. Contributing to the accident in part was the failure of the fuel gauge to indicate the actual amount of fuel on-board the airplane.

Another search of the CAROL database for accidents and incidents for the Aero Commander 500 or Rockwell 500 series airplane was performed for investigations in which the probable cause was determined, and the word “fuel” was listed in the analysis narrative. Ten additional cases were identified in which fuel exhaustion may have contributed to the outcome. None of those 10 case narratives mentioned postaccident testing of the tank unit, or fuel transmitter.

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Juan Garcia; FAA/FSDO; Miramar, FL Ryan Enders; Lycoming Engines; Williamsport, PA Les Doud; Hartzell Propeller, Inc.; Piqua, OH
Original Publish Date:	September 21, 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=101877