



# Aviation Investigation Final Report

<b>Location:</b>	South Haven Charter Township, Michigan	<b>Accident Number:</b>	ERA22FA351
<b>Date &amp; Time:</b>	August 2, 2022, 10:30 Local	<b>Registration:</b>	N9784Q
<b>Aircraft:</b>	Smith Aerostar 600	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Fuel contamination	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

A friend of the copilot reported this was the multiengine airplane’s first flight since the (single-engine-rated) copilot purchased it five years before the accident. He stated that the purpose of the flight was to conduct touch-and-go landings. Another (multiengine-rated) pilot was flying in the left seat, with the copilot flying in the right seat. On the day of the accident, when the friend arrived at the airport, he noticed that the airplane was not in the traffic pattern. After a few hours, he became concerned and reported the airplane missing to local authorities, and it was found the next morning in a heavily wooded area about one mile away from the airport. There were no witnesses to the accident.

Postaccident examination of the wreckage revealed that the airplane’s left propeller displayed signatures indicative of low rotational speed at impact, suggesting that the airplane’s left engine may have lost at least partial power. The right propeller showed signatures consistent with high rotational speed/power settings at the time of impact. Examination of the left engine’s fuel servo revealed that it was heavily contaminated with sediment and that the fuel pump had weak suction and compression. Either or both of these conditions could have reduced the left engine’s performance during the flight.

Additionally, the airplane was found with its wing flaps extended, the landing gear not retracted, and the left engine’s propeller was not feathered. A representative from the airplane’s type certificate holder stated that, depending on the airplane’s takeoff weight, it generally could not maintain level flight during an engine-out condition unless the flaps and landing gear were up and the failed engine’s propeller was feathered.

While there were no witnesses to the accident or other recorded data to suggest what flight regime the airplane was in when the loss of engine power occurred, given the stated purpose

of the flight and the findings of the postaccident examination of the wreckage, it is likely that, while maneuvering the airplane in the airport traffic pattern, the airplane's left engine lost power and the airplane subsequently impacted trees and terrain. Given the configuration of the wing flaps and landing gear and the unfeathered position of the left propeller, it is likely that the airplane's single-engine performance was degraded.

## Probable Cause and Findings

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

A loss of power to the left engine due to contamination of the fuel system. Contributing to the accident was the pilots' failure to properly configure the airplane for flight with one engine inoperative.

### Findings

<b>Aircraft</b>	Fuel - Fluid condition
<b>Aircraft</b>	Fuel control/carburetor - Damaged/degraded
<b>Aircraft</b>	Fuel distribution - Damaged/degraded
<b>Personnel issues</b>	Use of equip/system - Flight crew

## Factual Information

### History of Flight

<b>Maneuvering</b>	Fuel contamination (Defining event)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

On August 2, 2022, about 1030 eastern daylight time, a Smith Aerostar 600, N9784Q, was destroyed when it was involved in an accident near South Haven Area Regional Airport (LWA), South Haven, Michigan. The air transport pilot and commercial pilot were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the spouse of the copilot, who was also the owner of the airplane, he sent her a text message on the morning of the accident saying he was going to conduct three takeoffs and landings after a preflight inspection of the airplane. A friend of the copilot stated that he spoke to the pilot that same morning. The friend stated that this was the first flight since the copilot had purchased the airplane, and he planned to stay in the traffic pattern to conduct a few touch-and-go landings. The friend also mentioned that another passenger, who was also a pilot, had flown in to accompany the pilot. The copilot had purchased the airplane about five years before and had been working on it since then.

When the friend arrived at the airport he noticed the airplane was not in the traffic pattern. After a few hours, he became concerned and assumed that the airplane had landed at another airport. Later that evening, the copilot's wife called the friend to say she had not heard from her spouse. They contacted the local authorities and reported the airplane missing. The airplane was found the following morning in a heavily wooded area about one mile north of the airport.

During the recovery of the airplane, it was determined that the copilot/owner was in the right seat of the airplane. The pilot who had flown in to accompany the copilot was in the left seat.

The pilot held an Airline Transport Certificate with single-engine and multi-engine ratings. He held a flight instructor certificate with airplane single-engine, airplane multiengine, and instrument airplane ratings. He had accumulated about 28,500 total hours of flight experience.

The copilot/owner held a commercial pilot certificate with airplane single-engine land and instrument airplane ratings. He had accumulated about 3,250 total hours of flight experience.

The airplane came to rest oriented on a magnetic heading of 010° in a heavily wooded area. All major flight components of the airplane were still connected to airframe and located at the accident site. The cockpit and instrument panel were destroyed by impact forces. The cockpit displays and controls were destroyed. The engine control quadrant was impact damaged and the positions were unreliable due to the damage. The fuselage displayed impact and crush

damage. The wings were partially attached to the fuselage and displayed damage consistent with impact. All fuel tanks were breached, and the smell of fuel and browning foliage was present around the wreckage site.

Examination of the wings revealed the ailerons and flaps were still attached and displayed damage consistent with impact. Flight control push-pull tube continuity was observed from the primary flight control surfaces to the cockpit section. The tail section was separated from the fuselage and the left and right elevators remained attached to their respective horizontal stabilizer. The elevator trim tabs were impact damaged. The rudder remained attached to the vertical stabilizer and displayed impact damage. The flaps were observed in the 45° position, and the rudder trim tab actuator attach bracket was broken consistent with overstress, and the trim tab was impact damaged. The main landing gear were not up and locked within both wings.

The left engine was found partially detached and resting on the top of the wing. There was a smell of 100LL aviation fuel and browned foliage around the wing. During the examination of the engine the top spark plugs were removed from all cylinders. The engine's crankshaft was rotated 720° by hand, and suction and compression were observed on all cylinders. The No. 6 cylinder had an impact-damaged pushrod, but valve action was still observed. The magnetos were removed and both magnetos produced spark at all leads when rotated by hand. Examination of the engine-driven vacuum pump revealed it was free of any cracks or damage. Examination of the oil filter screen revealed it to be absent of debris.

Examination of the fuel injector servo for the left engine revealed it was securely attached to the engine. The unit was removed and disassembled. The fuel inlet screen was held into place by large amounts of sediment, corrosion, and metal contamination. The screen had some sediment on the inside of the screen, but most was on the outside of the screen and the walls of passageway in the unit.

A review of a maintenance logbook excerpt revealed the left "fuel injection servo" inlet screen was inspected on June 26, 2020.

Examination of the engine-driven fuel pump revealed it was attached securely to the engine. After being removed for further examination, the pump input drive exhibited resistance during rotation. A drill was used to rotate it at a higher rpm, but weak suction and compression was noted at the respective ports.

The left propeller exhibited signatures consistent with low rotation speed at impact including chordwise/rotational scoring and gradual aft bends with no twisting or notable leading-edge damage. The damage was also consistent with the left propeller being at or near the low pitch stop and not feathered at impact. The propeller governor was examined and the inlet screen was found to be clean of any debris. The propeller governor shaft input was rotated, and oil exited the unit.

The right engine was still attached to the right wing, crushed aft, showing damage consistent with impact. There was browning foliage around the engine and a smell of 100LL aviation fuel. During the examination of the engine the top spark plugs were removed from all cylinders and the engine's crankshaft was rotated 720° by hand. All cylinders produced suction and compression. The Nos. 4 and 5 cylinders had bent and impact damaged pushrods. Valve action was still achieved after removal of the damaged pushrods.

The magnetos were removed for the examination and both magnetos produced spark at all leads when the input drive was rotated by hand. The engine-driven vacuum pump was found free of any cracks or damage. The oil filter was impact damaged and was not removed for examination.

The right fuel injector servo was found securely attached to the engine. The unit was removed and disassembled. The fuel inlet screen was removed from the unit and found free and clear of any debris.

The engine-driven fuel pump was attached to the engine and removed for examination. The pump's input shaft was spun by hand and when rotated with a drill suction and compression was noted at the respective ports.

The right propeller exhibited signatures consistent with higher rotational speeds/power settings, displaying chordwise/rotational scoring, tip fractures, compound bend and twist patterns on two blades, forward bending on one blade, leading edge gouging, and indications of a bent pitch change rod. The damage was also consistent with the right propeller blades being near the low pitch stop and not feathered at impact. The propeller governor appeared intact and relatively undamaged.

A representative from the airplane's type certificate holder stated that, depending on the airplane's takeoff weight, it generally could not maintain level flight during an engine-out condition unless the flaps and landing gear were up and the failed engine's propeller was feathered.

The Medical Examiner and Forensic Services of the Western Michigan University School of Medicine, Kalamazoo, Michigan performed an autopsy of the pilot and copilot. Their cause of death was multiple blunt force injuries.

The Federal Aviation Administration's Forensic Sciences Laboratory performed toxicology testing on the pilot's tissue samples, which identified metoprolol and valsartan. Metoprolol is a prescription medication used to treat high blood pressure, angina, heart failure, and abnormal heart rates. Valsartan is a prescription medication used to treat high blood pressure and heart failure with left ventricular dysfunction. Neither medication is generally considered impairing.

## Pilot-rated passenger Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	70, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	October 30, 2020
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	3250 hours (Total, all aircraft)		

## Pilot Information

<b>Certificate:</b>	Airline transport; Commercial; Flight instructor	<b>Age:</b>	70, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane multi-engine; Airplane single-engine; Instrument airplane	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 1 With waivers/limitations	<b>Last FAA Medical Exam:</b>	January 19, 2022
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 28500 hours (Total, all aircraft), 0 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Smith	<b>Registration:</b>	N9784Q
<b>Model/Series:</b>	Aerostar 600	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	60-0416-143
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	June 10, 2022 Annual	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>	11197 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	IO-540-61B5
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KLWA, 666 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	07:55 Local	<b>Direction from Accident Site:</b>	160°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility:</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	3 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	80°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.99 inches Hg	<b>Temperature/Dew Point:</b>	19°C / 18°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	South Haven Charter Township, MI	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	South Haven Charter Township, MI	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	SOUTH HAVEN AREA RGNL LWA	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	665 ft msl	<b>Runway Surface Condition:</b>	Vegetation
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	42.35598,-86.258424(est)



## Administrative Information

<b>Investigator In Charge (IIC):</b>	Alleyne, Eric
<b>Additional Participating Persons:</b>	Michael Matthews; FAA/FSDO; Grand Rapids, MI Dave Harsanyi; Lycoming Engines; Williamsport, PA Les Doud; Hartzell Propeller; Piqua, OH Steve Speer; Aerostar Aircraft Corp; Hayden, IN
<b>Original Publish Date:</b>	August 29, 2024
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=105647">https://data.nts.gov/Docket?ProjectID=105647</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).